PANAMA

AND THE CANAL

ENLARGED EDITION

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INTRODUCTION

"Castilla del Oro"—Golden Castile—was the name given by Columbus to the Isthmus of Panama, in honor of Isabella, good queen of the old Spanish kingdom of Castile. Golden, indeed, it was to be, a land of treasure far beyond the dreams of the Great Discoverer. "Grave of the Spaniards"—the pioneers called it, who fought to win the treasure from savage Indians, cruel pirates, and a deadly climate. "Key to the Pacific"—some, too, have named it;—as if, when Nature raised the broad continents of North and South America between the Atlantic and the Pacific, she originally planned a waterway at this convenient spot to connect the two oceans; and then, as an after-thought, threw in this bit of land, at its narrowest point scarcely thirty miles wide, and with its hills at one place only three hundred feet above the sea, as a challenge to the strength and skill of mankind.

Four hundred years ago men accepted the challenge. First Spain, then Scotland, England, and France poured out money and life in a vain effort to build a waterway and to defeat the powers of Nature. Last of all, the United States, led by a dauntless President, took up the fight.

"This is the greatest engineering work the world has yet seen," said President Roosevelt, "but the Canal shall be built!"

These names tell in short the story of the Isthmus. In all the Western Hemisphere no spot has had so romantic a history as this small strip of land that joins the two continents but separates the two greatest oceans of the world.

PREFACE

In this little book the authors have attempted to present the history of Panama and of the Panama Canal in a manner which will be interesting and intelligible to younger readers. As a possession of the United States the Canal Zone deserves attention from teachers of geography and history. The state of Panama itself has had a most dramatic and thrilling history. And the Canal is not only a wonder of modern engineering but is also an American achievement of first importance. The story is full of important facts in history and geography and presents a fund of information of a distinctly educational character.

For the early historical matter the authors have drawn freely upon such material as is found in Fiske's Discovery of America and in a large number of books of a similar character. Through the courtesy of the Isthmian Canal Commission, many records and pictures have been secured. These have been supplemented by photographs taken on the Isthmus and by personal observation and study in the Canal Zone.

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CHAPTER I

A ROUTE FROM EUROPE TO ASIA

Every schoolboy today knows more of geography than the most learned man in Europe knew five hundred years ago. When Columbus was puzzling over his Latin books and learning to draw maps in the schools of Genoa, Italy, no teacher could have told him the real size and shape of the earth. A few persons believed that the earth was round like a globe but thought it much smaller than we now know it to be. The maps of that day marked with certainty only the continent of Europe, the Mediterranean Sea, a little of the north of Africa, and some of the western parts of Asia. What the remainder of Asia and Africa was like, no one could say. West of Europe was the Atlantic ocean, called the Sea of Darkness. No European ship was ever known to have crossed it. It was an ocean of unknown dangers. Sailors were afraid to try it. And as for North and South America and the Pacific ocean, stretching ten thousand miles beyond them, there was not the faintest idea that they existed.

The Portuguese Find a Route to Asia

In those days, of course, there were no steamships nor railways. Nor was there any way for even small sailing

vessels to pass from the Mediterranean into the Indian ocean and so direct to India, China, and Japan. The journey to the East was difficult and dangerous. Pirates, Turks, and highway robbers, and many long miles through unknown lands frightened the boldest traveler. And yet there were a few, perhaps not over half a dozen, who had visited China and India, and had come back, like Marco Polo, with such tales of strange lands and rich cities as to fill Europe with wonder and surprise.

CHRISTOPHER COLUMBUS.

In the markets of Genoa Columbus, no doubt, saw the valuable drugs and spices, handsome rugs and silks, and the almost priceless gold and jewels which the slow caravans brought out of Asia to the Mediterranean and there sold to the traders from European cities. These oriental goods were in great demand, and the merchants in Venice, Genoa, and other towns made immense profits in this trade.

It is not strange that during the boyhood of Columbus men were curious to know more of the wondrous eastern coast of Asia, and were greedy for its wealth. If only some new, outside waterway to Asia could be found, its millions of people might be conquered and its riches brought cheaply

home to Europe. This was the great desire. Merchants and sailors, soldiers and priests, and even kings and queens hoped to share in the gold and glory of such a discovery.

Twenty years before Columbus was born, Prince Henry of Portugal, called the Navigator, made up his mind that if a way around the southern end of Africa could be found, Portuguese ships might sail direct to India. For forty-five years this generous and devoted man denied himself the pleasures of the gay court of Portugal and devoted his life to the task of discovery. When he died in 1463 his daring sailors had explored the west coast of Africa for more than two thousand miles to Sierra Leone (Map I, p. 2). For years after his death his nephew, King John II, continued the explorations. In 1487 success rewarded these patient efforts. After a most remarkable voyage of at least thirteen thousand miles, Bartholomew Diaz (De'äth) returned to Portugal with battered ships and worn-out crews, and reported that though he had not actually reached India, he had passed the southern cape of Africa and had sailed into the Indian ocean. "Let the cape be called Good Hope," said King John, "for now we have good hope that the long-sought ocean route to India has been found."

We can scarcely imagine the interest which this discovery aroused in Europe, nor the envy with which the other kings looked upon this new Portuguese route and saw King John about to secure the riches of Asia for himself and his country.

Columbus and the "Shorter Route"

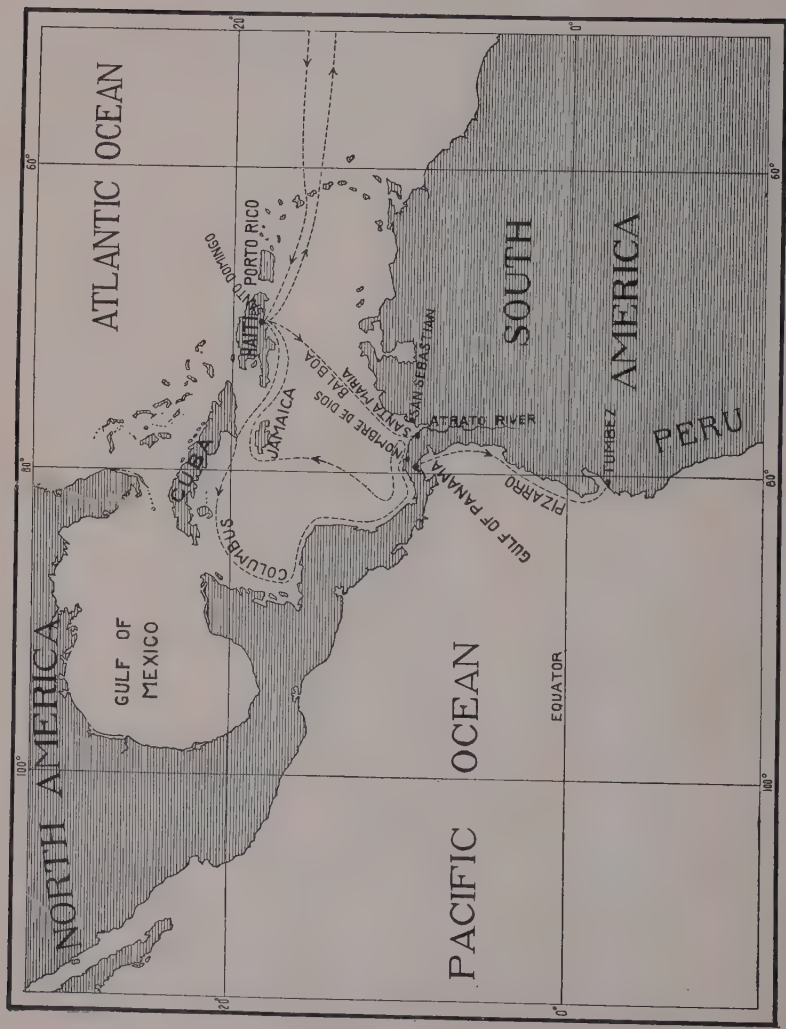
Now it happened that Christopher Columbus and his younger brother Bartholomew had become not only expert map makers but also excellent seamen. Columbus tells us that he went to sea when scarcely fourteen years old. About 1470 they left their home in Italy, went to Portugal, and joined the expeditions down the coast of Africa. In fact, Bartholomew was a seaman on the ships of Diaz, when the great journey was made around Cape Good Hope. It was now clear to all that the Portuguese had found a route to Asia but that it must be at best very long and tedious. Africa proved to be much longer than was expected.

In 1484 Christopher Columbus had made the astonishing proposal to King John that ships be given him for a voyage directly westward across the Atlantic. He declared that if the earth were really round, Asia could surely be reached in that way; and that instead of a route by Cape Good Hope of at least ten thousand miles, a journey west of only two thousand five hundred miles, as he figured it, would bring him to the rich island of Japan. The idea was not new, though few believed in it; but the courage to make the journey was new. King John was struck with the boldness of the plan, but his advisers declared that it was certain to be a failure. The ships were not given him, and Columbus in disgust departed hastily from Portugal to offer himself and his great idea to Ferdinand and Isabella, king and queen of Spain.

We all know the remainder of the story,—eight long years of delays, disappointments, poverty, and ridicule; the final favorable decision of Queen Isabella; and the three little ships that set out from Palos on a Friday morning in August 1492, for the most notable journey ever made across the seas.

We know, too, the intense excitement in Spain upon his return with news that he had crossed the Atlantic and had discovered some islands which he believed to be close to the coast of Asia. Honors were heaped upon him and he became the hero of the hour. Seventeen ships and fifteen hundred men at once prepared to set out for further discovery. Everyone supposed that Spain had beaten Portugal in the race for the untold riches of Asia. Now it was the turn of King John to be envious. Alas for poor Columbus! Though he did not know it, he had not reached Asia after all, only Haiti and Cuba!

This second trip lasted many months and proved most disappointing. The West India Islands were explored, thousands of fierce cannibal Indians encountered, but there were no rich cities nor coasts of Asia nor ship-loads of wealth brought back to Spain. Columbus's enemies now began to call him a humbug and to plot his ruin. And the king, too, began to think that his voyages were of little value after all. Yet a third voyage was made in 1497. At the same time a number of other Spanish captains crossed the Atlantic on similar voyages of discovery.



MAP II.—COLUMBUS AND THE ISTHMUS.

Hundreds of miles of the coasts of North and South America were explored. A little gold was found and some Indians captured to be sold as slaves; but the ships returned with no "shorter route" to Asia discovered and with the sad tidings of the horrible death of hundreds of Spaniards at the hands of the fierce Indians of the West Indies.

Imagine, then, the feelings of King Ferdinand and of Columbus, when the news came, in the summer of 1499, that Vasco da Gama, in the service of King John, had sailed around Africa by the Portuguese route and had actually reached India, had seen its rich cities, and brought back his ships to Portugal loaded with silks, satins, ivory, spices, rubies, and emeralds. Asia had been reached! How mean Columbus's voyages now looked in comparison with this triumph!

Portugal had won the race by the longer African route. No wonder that men began to doubt the existence of Columbus's "shorter route." Not so Columbus. He was now an old man, poor and sick; but his noble spirit still clung to the belief that somewhere, through the new lands that he had found, there must be a waterway that would lead him on to Asia. Spain must do something to offset the triumph of Portugal. So it came about that the king and queen sent him from Cadiz, on the 11th of May, 1502, on his fourth and last voyage.

Columbus and the Isthmus

In June he reached the West Indies, and in July the Cape of Honduras south of Yucatan (Map II). For five

months he proceeded southward down the coast, encountering head winds and wretched weather, but encouraged because he found the Indians there living in large stone houses, possessed of much good pottery and copper tools,

"The Beautiful Harbor of Porto Bello."

and well clothed in brightly-colored cotton garments. There were plentiful evidences of gold, too, and many natives were seen with plates of gold suspended from their necks. Surely the rich lands of Asia could not be far away! On down the coast the vessels went, until they reached the Isthmus of Panama. Here the low hills, clothed with dense tropical forests, rose but little above the sea. Each bay

and river was now carefully explored, especially the Chagres river, up which Columbus went to its sources, and was at one time but fifteen miles from the Pacific! The beautiful harbor of Porto Bello (Good Harbor) was entered and named on November 2, 1502. Still no passage to the west was found. Already the sailors were grumbling; the food was almost gone; and the vessels were worm-eaten and hard to manage. Yet the determined man pressed on mile after mile, hoping against hope. But in December, having passed along the entire coast of Panama, and being completely discouraged at finding no westward passage, he was forced to turn about and head for Cuba. A year of shipwreck, a sad return to Spain, two years of neglect and misery ended the life of this great seaman in 1506. There was no waterway through Panama. The Isthmus had conquered the noblest of all discoverers.

CHAPTER II

BALBOA AND THE PACIFIC

The schoolbooks tell us that the first white man to prove that Panama was but a narrow strip of land and that a great ocean lay to the west of it,—was the Spanish cavalier Balboa. Perhaps few of us know that this great discoverer set out for Panama in a barrel. Balboa in a barrel! Such an amusing way of reaching the Isthmus deserves a word of explanation.

The Spaniards Settle in Panama

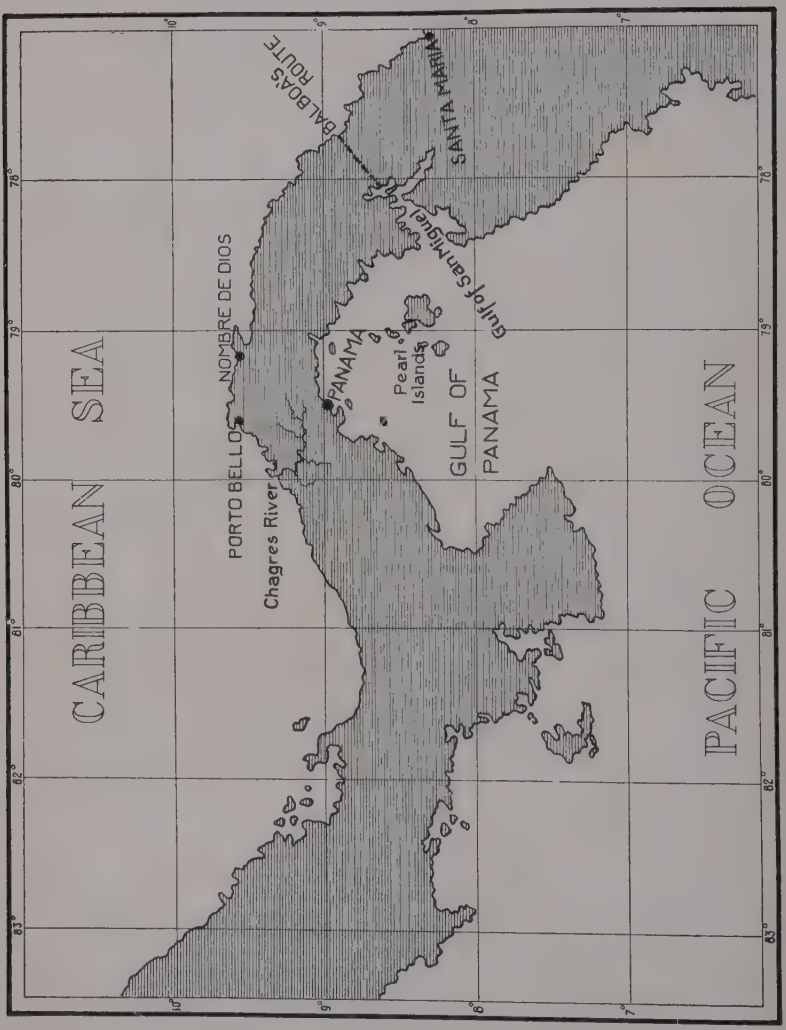
When the Spaniards began to doubt if they could reach Asia by a westward waterway, they determined at least to conquer the newly-discovered lands and to secure their gold. Ships began at once to sail to Panama. There they found gold in plenty in the sand of the rivers and returned to Spain heavily loaded. Within a year King Ferdinand created two provinces on these coasts—one, from the Atrato river eastward (Map II, p. 8), was given to the discoverer Ojeda (O-hā′thä); the other, the Isthmus of Panama—called Golden Castile—was given to a court favorite Nicuesa (Ne-koo-′āsä). These two governors set sail with parties of settlers in 1509.

On reaching the eastern shore of his province Ojeda

rashly went ashore with seventy men to catch some Indians for slaves. A fierce fight followed and all but Ojeda and one companion were killed by the savages. Thus began the bloody struggle with the natives, which was to continue for many years and to end only when the latter were nearly destroyed.

Vasco Nuñez de Balboa.

The remainder of Ojeda's party had scarcely built their miserable little settlement at San Sebastian (Map II, p. 8), when they began to die of famine and sickness. Ojeda at once left the party in charge of Francisco Pizarro and sailed for Santo Domingo on the island of Haiti for supplies. Now it happened that in Santo Domingo there lived a handsome young man heels over head in debt, and in terror lest he be sent to prison. He contrived to hide himself in a barrel and was rolled on board the ships that were about to set off with food for the starving men at San Sebastian. Days passed. And when Santo Domingo and his debts



Map III.—"The Spaniards Settle in Panama."

were left far behind, to the disgust of the captain, out crawled the gay Balboa from his barrel. Surely his courage deserved a better fate than was in store for him at Panama.

San Sebastian was relieved, its survivors deserted the unhappy spot, and joined the new-comers to build a new town called Santa Maria. It was the first on the Isthmus. The energetic Balboa soon became the leader of this settlement (Map III).

The So-called Balboa Tree. From Its Top Both Atlantic and Pacific can be Seen.

Terrible misfortunes also befell Nicuesa's party. They made a landing on the Isthmus and built a settlement which they called Nombre de Dios (Nom'-brā-dā-Dē'ōs)—Name of God. In a few months, of seven hundred men, only Nicuesa and sixty-nine others were left. Scarcely a white settlement in all America can show a more dreadful record of death,—nine dead out of every ten. And Nicuesa with the sixty-nine had become "filthy and horrible to behold," and nearly mad for lack of food. At last, in two

small boats, they sailed east to Santa Maria. There the settlers were so afraid of Nicuesa that they would not let him land. With seventeen followers he set out again to sea and was never heard from.

View of Atlantic from Balboa Tree.

After such awful sufferings it is surprising that the few Spaniards who remained did not speedily leave Panama and return to Spain. One thing kept them at Santa Maria. A nearby Indian chief, by name Comogre, made friends with Balboa and gave him seventy slaves and a large quantity of gold. The story is that as the Spaniards were weighing the treasure and quarrelling as to how it should be divided, the Indians were astonished at their excitement. We know that the natives used their gold only for ornaments and knew little of its value. A son of the chief told Balboa that if the Spaniards prized the yellow metal so highly, they should cross the mountains to a great sea, where, far to the south, people lived who had no end of the precious metal. Fired with excitement at this

news of more gold, the settlers were willing to remain. Balboa planned to cross the mountains and to see for himself if a way could not be found to the land of treasure.

The Pacific Discovered

Some months later, in September, 1513, with two hundred men, he plunged into the tropical forest. On the 25th of that month, from a high point of land on the Isthmus, he and his men looked with astonishment at a vast expanse of water stretching off to the west and south as far as eye could see. Four days later, on the 29th, having reached the water's edge, Balboa claimed possession, for the king of Spain, of the greatest ocean on the globe.

View of Pacific from Balboa Tree.

Eager to make further plans, Balboa hurried back to Santa Maria, only to find to his dismay that fifteen hundred greedy adventurers had arrived from Spain,—all bent on sharing in the conquest of the golden country. With this company came also a new governor for the Isthmus. This man, Pedrarias, has been called a "two-legged tiger." He

was one of the most evil and brutal men ever sent by Spain to the New World. At once jealous of Balboa, he did all in his power to prevent his expedition to the golden country. But Balboa pressed on his preparations. His energy was amazing. By 1517 he had forced the Indians to cut a roadway through the dense jungles and to carry four ships, piece by piece, across to the Pacific; had put them together again; and was ready to sail down the coast of South America. Two thousand Indians are said to have perished in this task.

But here Balboa's career was to come to an untimely end. The hatred of Pedrarias could allow him to go no further.

Death of Balboa

He was arrested, tried on a false charge of treason, and beheaded by order of the governor. So perished the first white man to cross Panama,—the Discoverer of the Pacific. Others must find the golden country.

CHAPTER III

PIZARRO AND THE GOLD OF PERU

For the next seven years the Spaniards were satisfied to secure the treasure that was to be had near at hand. In 1519 Pedrarias began to build the city of Panama on the Pacific and to connect this with the Atlantic by a road across the Isthmus, first to Nombre de Dios and later to Porto Bello (Map III, p. 14). The Pearl Islands in the Gulf of Panama were conquered and their chief gave the governor at one time, we are told, "a basket full of pearls weighing one hundred and ten pounds, —whereof some were as big as hazelnuts. One of these alone was later sold for one thousand two hundred ducats (about $1,500)." The Spanish also seized Nicaragua. Everywhere gold was forced from the natives

Francisco Pizarro.

by every manner of fiendish cruelty that men mad with greed could devise. They were made slaves. They died by thousands. But now from Panama ships began to sail away to Spain with heavy cargoes of treasure and many Spaniards returned in them to swell the population of Panama.

Spanish Treasure Ships

But this was only the beginning. In 1524 Francisco Pizarro received permission to take up again the plans for dis-

Descendants of the Incas of Peru. Old Inca Masonry in Background.

covering the golden kingdom away off to the south. This distant land the Spaniards called Peru. It extended south of the equator for more than a thousand miles down the

western coast of South America, and was the richest and most highly developed of any part of the New World. Here were well-built towns, with palaces and temples of strange

Bridge Still Standing on the Old Road from Panama to Porto Bello.

and splendid workmanship. Here were fine roads, fertile fields, and millions of people. And here, too, were mines of gold and silver from which the rulers, called Incas (Ing'-käs), had gathered an almost unbelievable store of metal.

Conquest of Peru

We cannot here tell the long and thrilling story of the hardships suffered by Pizarro and his men. No one can read it without being amazed by the reckless daring which finally brought them to the coast of Peru. Nor is this the place for the sad story

of the conquest. Horses and bloodhounds the natives had never seen before and were intensely afraid of them. Their weapons, too, were no match for the swords and firearms of the Spaniards. And so there followed in Peru the same greedy scramble for gold as at Panama,—the same torture, massacre, treachery, and slavery.

The enormous wealth that now fell into the hands of Pizarro's men is difficult to estimate. We are told that when one of the rulers of Peru was held prisoner by the Spaniards in a room twenty-two feet long by seventeen feet wide, "he made a mark on the wall as high as he could reach with his hand, and offered as ransom gold enough to fill the room up to that height." The offer was accepted and more than $15,000,000 in gold was thus secured. Another ruler was promised his freedom for a similar amount. After it was collected, he was treacherously murdered. Immense quantities of silver were also secured.

Here, indeed, was the Golden Kingdom and Spain proceeded to make the most of it. Peru and, in fact, the whole west coast of South America was slowly but surely conquered. Spanish towns were built and Spanish authority established. The natives were forced to work the mines. Vast quantities of gold, silver, and tropical products were shipped north to the city of Panama, to cross the Isthmus to Porto Bello, where fleets of Spanish ships came each year to convey them home to Spain. A fine stone road now connected Porto Bello and Panama. The two cities were

strongly fortified, and the latter, in particular, became one of the greatest and richest in America. The fortunate situation of the city on the Isthmus made it a most important center of Spanish power. "It contained two thousand large buildings and five thousand smaller,—all of which were three stories high, and were elegantly constructed and richly furnished. Its merchants lived in great opulence, their houses rich in articles of gold and silver, adorned with beautiful paintings and other works of art, and full of the luxuries of the age." "The prosperity of Panama was the wonder and envy of the world."

Wealth of Panama

Moreover, the wealth of America filled to overflowing the treasuries of Spain. Once a poor and weak country, she now was rich and powerful. Her ships ruled the seas and her soldiers were the finest in Europe. Within fifty years after the death of Columbus, the commands of the emperor of Spain were law for more than half of Europe.

PART II

GRAVE OF THE SPANIARDS

CHAPTER IV

THE PIRATES

"Cheaply bought, dear in the end," is an old Spanish proverb. The hidden treasure of America, opened as if by magic, and the sudden rise of Spain to power, let loose the harsh and evil traits of character that were in the end to corrupt all classes. In the New World, where murder, theft, and slavery were the rule, men came to despise honest labor. This same spirit soon showed itself in the mother country. Enterprise and industry declined. Pride and tyranny in America bred bad government at home. The rulers seemed mad with a desire to crush out all liberty in their wide empire. "It was an ill fortune," says one writer, "that led the Spaniards to those parts of America in which the precious metals were found, for the ruin of their own country was hastened by the cruel plundering of Peru."

Effect of Her Conquests on Spain

Spain conquered Portugal in 1580 and so came to control with iron hand nearly all the commerce on all the oceans. This drove both the Dutch and the English to make war. For more than two hundred years the Spanish were obliged to fight almost constantly to hold what they had won. Their soldiers and sailors were brave enough, as we

know, but corruption and mismanagement at home meant defeat for Spain abroad.

Her possessions in America were most open to attack and were now more and more poorly defended by half-paid and half-starved troops. French, English, and Dutch pirates began to infest the West Indies and to lie in wait for the rich merchant vessels and treasure ships that sailed between Spain and Panama. So bold were these pirates and so numerous their ships and men, that Spain was helpless, and her commerce was ruined. Captain Sharp, Lewis Scott, Davies, and Dampier were pirates at the very mention of whose names Spaniards trembled.

But the prince of pirates or buccaneers, as they are sometimes called, was Henry Morgan. The account of his exploits at Panama makes the tales of pirates in the storybooks seem tame indeed. Born in Wales, he ran away to sea when still a mere boy, was sold as a slave, joined the pirates, became a leader, and took part in many wild adventures.

Henry Morgan

At length he determined to attack Porto Bello and assembled nine ships and four hundred and sixty men,—a motley band of cut-throats. The town was so large and so well protected by two strong forts at the mouth of the harbor, that Morgan scarcely dared at first to tell his men to what place he proposed to take them. But so skillfully and secretly did they approach the harbor that they were able to surprise, seize, and blow up one of the forts. The

sound of the explosion caused wild panic in the town. The garrison of the other fort fought with great courage, though unable long to resist the furious attacks of Morgan's men. No quarter was given, the town was set on fire, and

"Ruined Fort with Its Guns and Watchtowers."

those of the inhabitants who were not able to escape to the forests, perished in the streets or burning buildings. For fifteen days the pirates gave themselves up to every manner of debauchery in the enjoyment of their plunder. About all that was left of the flourishing town of Porto Bello was the ruined fort with its guns and watchtowers. Today they can still be seen much overgrown by the tropical jungle.

INTERIOR OF FORT SAN LORENZO.

"Cloud-crested San Lorenzo guards
The Chagres' entrance still,
Tho' o'er each stone dense moss hath grown,
And earth his moat doth fill."

Before he left Morgan sent an insulting message to the governor of Panama, to the effect that he would soon return and do to Panama what he had done to Porto Bello. True to his word, he returned in 1671. News of the great booty captured at Porto Bello, and of the still greater expedition now planned, had attracted pirates from far and near. Thirty-seven ships and two thousand men were soon under Morgan's command.

City of Panama Destroyed

"On the Spaniards' beach they landed,
Dead to pity, void of fear,—
Round their blood-red flag embanded,
Led by Morgan the Buccaneer."

This time it was at the mouth of the Chagres river and the powerful fort, San Lorenzo, was captured. Chagrestown was destroyed and the pirates continued up the river as far as they could go. Then came such a nine days' march overland as only hardy pirates could have endured. Morgan had failed to bring any food for his men and the Spaniards had not only made the road nearly impassable but had also carefully burned everything that could be eaten. At last, from a high point of land the buccaneers looked down upon the lovely harbor and beautiful city of Panama. "In a valley below the eminence upon which they stood, herds of cattle peacefully grazed. The pirates rushed among the animals and, slaughtering them, devoured their flesh raw. After this savage feast they pushed on and

soon the plain of Panama lay before them with the city on the further side."

Old Panama was not a walled city. Therefore the governor had collected his four regiments of soldiers and two

Oldest Spanish Church Still in Use on the Isthmus.

hundred cavalry on the open plain outside the town. Here he had collected also a herd of two thousand wild bulls, with Indians to drive them headlong against the ranks of the pirates. In the fight that now began these bulls caused the greatest confusion. The pirates succeeded in turning them back upon the Spaniards, but the latter held their ground for two full hours of furious battle. When the cavalry

had been routed and at least a thousand men lay dead on the field, the ranks of the defenders at last broke, muskets were thrown away, and a wild rush for the town began.

Not even the great guns of the Spaniards could check the invaders. In three hours more they were in possession of the city. Immediately the dwellings and public buildings were set on fire, and flames and smoke added to the horrors of robbery and massacre. Few of the inhabitants

City Walls of New Panama.

escaped death or capture. Then, amid the ruins, for a full month, the captors indulged in such acts of torture and debauchery as only the imagination can picture.

Massive Tower of Saint Augustin.

Finally the return march began. One hundred and seventy-five mules and six hundred prisoners helped to carry the plunder back across the Isthmus to the ships,

Wall of Tower of St. Augustin.—Note Thickness of Masonry.

where the final division was to be made. But with the base and cunning treachery of a true pirate, Morgan and a few friends, while their comrades slept at Chagrestown, loaded a vessel to the water's edge with the most valuable part of the spoil and sailed away to the English island of Jamaica. Strange to say, the outrageous acts of this brutal man were readily forgiven him by King Charles II of England, and he lived to be honored and knighted as Sir Henry Morgan.

The massive tower of the cathedral church of Saint Augustin, whose bells "rang out their clear chimes one hundred years before the Pilgrim Fathers landed on Plymouth Rock," alone struggles, amid rank vegetation, to mark the sight of the once golden city of Panama.

The fall of the city of Panama marked the beginning of the end of Spain's power in the New World. Though the Spaniards soon built a new town, the present city of Panama, five miles west of the old site and spent, it is said, more than eleven million dollars to protect it by huge walls of masonry, the trade and wealth and glories of the older days never returned. The province of Panama, from which so much of Spain's great possessions had once been ruled, was soon to be one of nine departments of the province of Colombia, and to be ruled from the capital at Bogotá.

New Panama

A century of slumber and decay followed. As Spain's power in Europe declined, her rule in America became more than ever oppressive. When our great-grandfathers, led by George Washington, fought for freedom from England, the spirit of liberty was spreading in South America. While Washington was President of the United States, the famous patriot Simon Bolivar was born in Venezuela. Colombia declared herself free from Spain in 1811. By 1824 Bolivar had put an end forever to Spanish rule in South America. The Isthmus remained a part of Colombia

until 1903, when it became the independent Republic of Panama.

From Columbus on for more than three hundred years, Spain had held the Isthmus. Its possession had been, indeed, "dear in the end,"—a real "Grave of the Spaniards."

PART III

MODERN PANAMA

CHAPTER V

LAND OF THE COCOANUT TREE

"Away down south in the Torrid Zone,
North latitude nearly nine,
Where the eight months' pour once past and o'er,
The sun four months doth shine;
Where 'tis eighty-six the year around,
And people rarely agree;
Where the plantain grows and the hot wind blows,
Lies the Land of the Cocoanut Tree."

The history of Panama thus far has brought us on through stories of the brave old days of romance and adventure, of treasure ships and daring pirates, of Spanish rule and ruin, to modern Panama. There are stories of romance and daring, in no way less thrilling, yet to be told; but we shall understand them better, if we first make a visit to the Isthmus to see for ourselves what this interesting strip of land is like. This will not be a difficult journey, for comfortable ships from New Orleans or New York will take us to Colon, its northern port, in less than a week. And Panama is a small country, too, only four hundred and twenty-five miles long, two-thirds the size of

Pennsylvania, and not quite so large as the state of Indiana (Map IV).

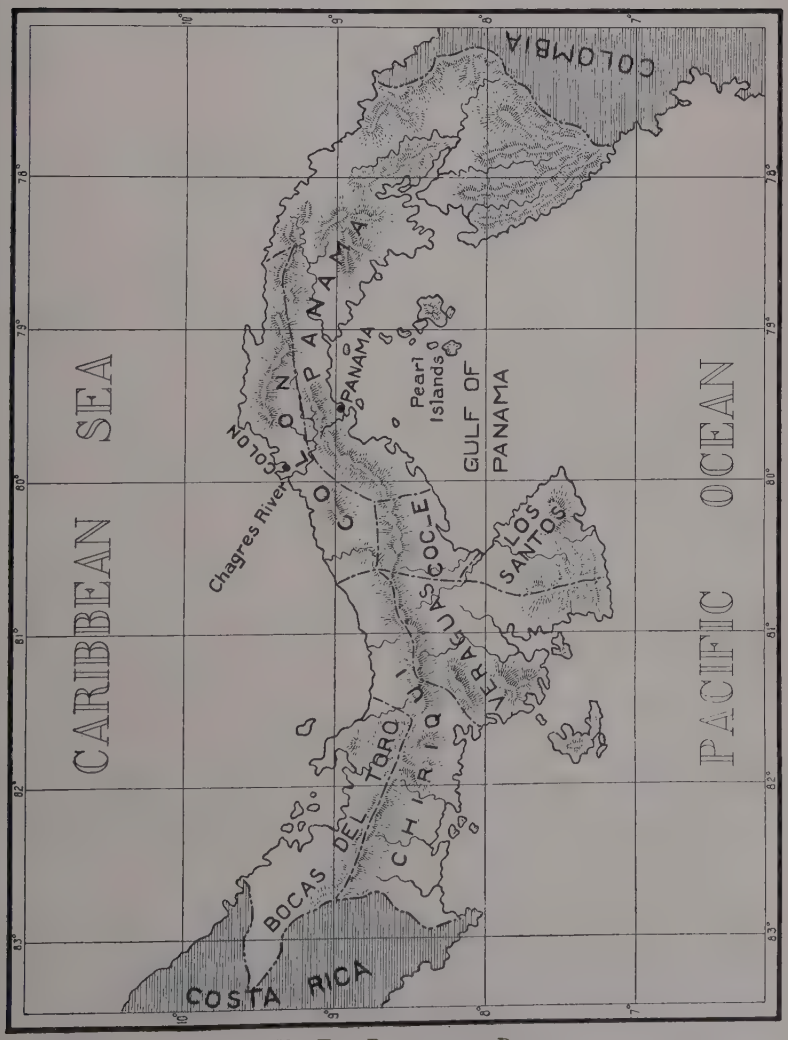
Our ideas of its geography will, no doubt, need some correction. We usually think of South America as somewhere directly south of the central part of the United States, and of the Isthmus, as running north and south between the two continents. It is surprising to find that nearly all of Panama is further east than Florida —(Map I, p. 2), and that the City of Panama is no further west than Pittsburg. The Isthmus, too, is shaped like a flat letter S and really runs about east and west—(Map III, p. 14). At Colon, on the Atlantic side, the sun rises over the land and sets over the ocean,—just the opposite of our expectation. Someone has said very truly that there always seems to be "something crooked about the Isthmus."

Geography

Panama is only nine degrees north of the equator, and so has in all respects a tropical climate. The average temperature for the entire year in the principal cities of the United States is about 55° (Fahrenheit) above zero. In New Orleans it is 67°; in Boston, 50°. In Panama we must be prepared for many days in which the temperature reaches nearly 100°, and for nights that seldom are below 74°. The average for the year is considerably above 80°,—or 30° hotter than Chicago.

Climate

In the United States we are accustomed to four seasons during the year, with extremes of heat in summer and of cold in winter. There are two seasons at Panama, but sum-



Map IV.—The Republic of Panama.

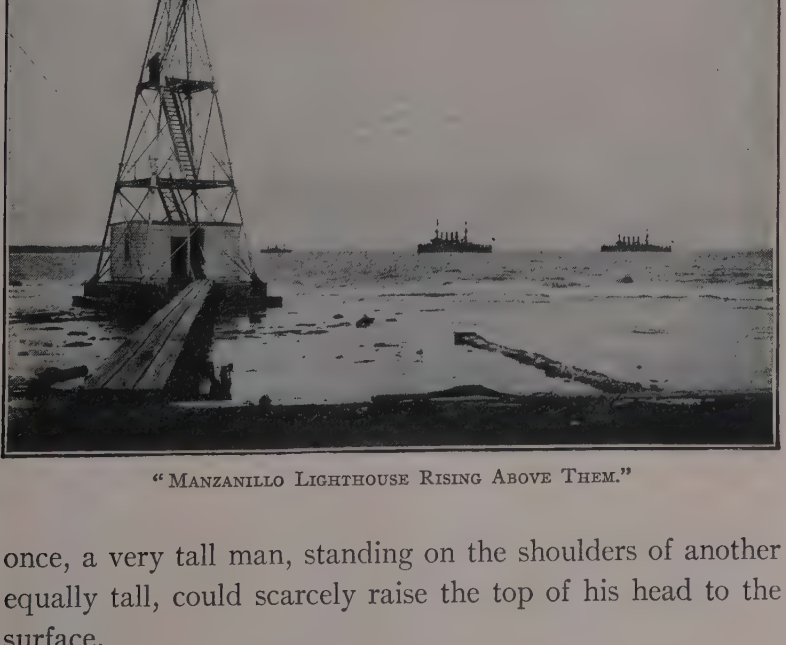
mer temperature continues the whole year through. The two seasons depend not upon the heat but upon the rainfall. For eight months, from May to December, great

U. S. Battleship in Harbor of Colon.

masses of rain clouds are blown across the Isthmus from ocean to ocean, and terrific downpours of rain occur almost daily. The whole land is drenched for long periods. The inside of the driest houses becomes damp and musty. Books mold on the shelves, linen loses its stiffness, iron rusts, and the air is everywhere heavy with moisture. Then, beginning about the first of January, comes the dry season of four months. Yet the name "dry season" is deceptive,

for even during that period showers are frequent. The fact is, Panama is one of the wettest places in the world and is thoroughly damp the year round.

On the Pacific side six feet of water fall in a year, and on the Atlantic side, fully twelve feet. This is three times as much as falls in a year's time in Boston and fourteen times as much as in El Paso, Texas. Someone has said that if the rain that falls at Colon in a year came all at



"Manzanillo Lighthouse Rising Above Them."

once, a very tall man, standing on the shoulders of another equally tall, could scarcely raise the top of his head to the surface.

If it be the dry season, the approach to the Isthmus by steamer is not without beauty. Great masses of white clouds drift lazily over the low green hills that rise one above another from the sea-coast. Here and there bold headlands and deep bays can be seen, and many small islands seem almost to float like ships upon the blue waters of the Caribbean. Off in the distance is the mouth of the Chagres river, and straight ahead, the harbor

Colon

Steamers at Colon Docks.

and town of Colon, with Manzanillo lighthouse rising above them. In the harbor and at the docks are scores of ships; for even now more than one hundred thousand travelers

and a million tons of merchandise cross the Isthmus each year.

Colon is the Spanish form of the word Columbus and

COLON—BEFORE IT WAS CLEANED BY THE UNITED STATES.

is the name given to the town by the government of Colombia in honor of the Discoverer. On his last journey to America Columbus entered Colon harbor in November of 1502 and called it Bahia de los Navios.

In the town of Colon itself, we shall be greatly disappointed. It would be hard to imagine a less interesting and attractive place. How low and small and dirty it is! The land on which it is built is but two or three feet

above sea-level and behind it for miles are dreary and unhealthful swamps. Certainly it was a great mistake to build a town on such a spot. A tremendous amount of filling in with rock and soil has been done in order to make it in any sense a decent place to live in. Low frame houses; narrow, ill-smelling streets; a population of a few thousand people of many nationalities; and little or nothing of interest to be seen, make Colon an unpleasant introduction to a visit on the Isthmus.

Leaving Colon behind we shall pass on into the interior of the country and finally across to the larger and more attractive City of Panama on the Pacific coast. These two towns and the country lying between them are about all of the Isthmus that is seen by the usual traveler. Much of the remaining country is almost impossible to visit. There are few roads and many hundred square miles even now are unexplored and uninhabited. The whole population of Panama is about 350,000. Outside of Colon and the City of Panama the inhabitants are scattered about the Isthmus in many small villages, mostly on the sea-coast.

The Interior

We may find it confusing at first that both the country and its chief city are called Panama. To avoid difficulty we shall always speak of the latter as the City of Panama.

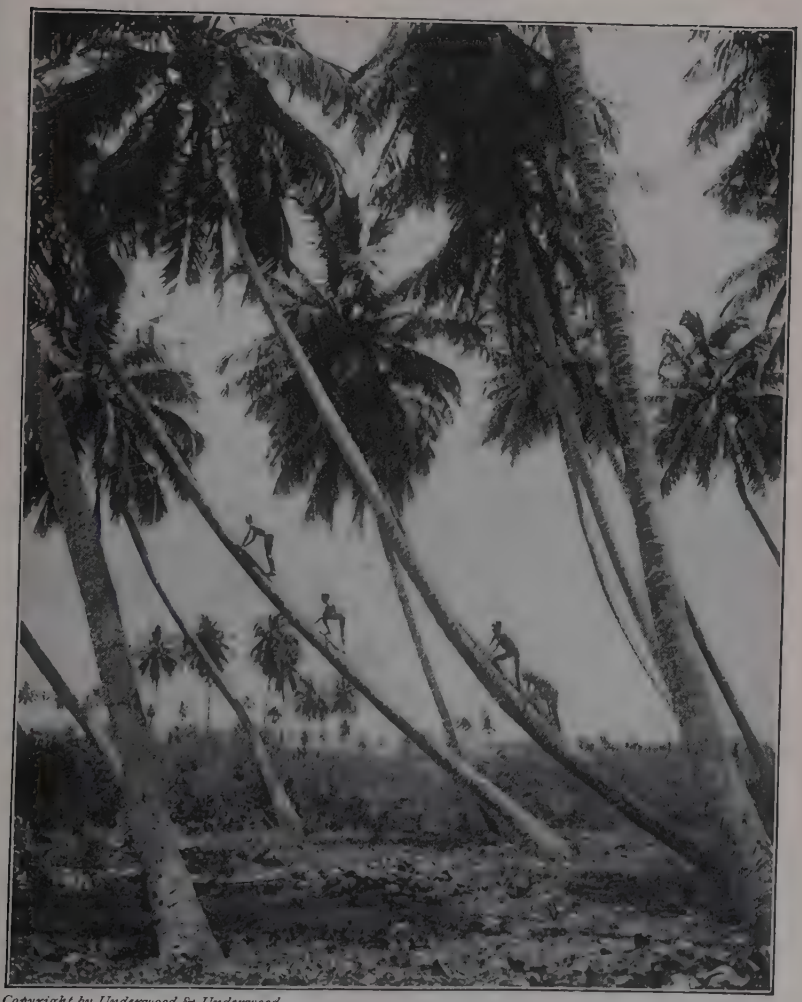
A low backbone of hills, called the Cordillera de Bando, extends throughout the length of the Isthmus. Only at a few points do these hills become real mountains. The

CHAGRES RIVER AT GATUN—SHOWING NATIVE VILLAGE AND BANANA TREES BEFORE CANAL WAS BUILT.

greater part is low and rolling. In the flat, winding valleys between the hills are many small rivers. The principal ones are the Rio Tuyra, Rio Grande, Rio Chepo, and the Rio Chagres. The latter flows into the Atlantic and is next to the longest and largest. (Rio means river in Spanish.) In the dry season the rivers are little more than small streams, pushing sluggishly through their swampy channels toward the sea. The Chagres is then about two hundred feet wide and three or four feet deep. But in the rainy season the rivers become raging torrents, flooding miles of land. The Chagres has been known to rise thirty feet in one night, and for days at a time it sweeps away all in its path.

In the interior of the country, away from Colon, there is much to see of great interest, especially to those of us who have never been in the tropics. With a hot climate, rich soil, and much moisture, almost the whole of Panama, up to the very hill-tops, is covered with a tangled jungle, in which nearly every form of tropical vegetation flourishes in rank luxuriance.

Everywhere we see flowers of most brilliant coloring. And ferns, shrubs, and vines make a thick undergrowth. There are many strange trees, too, unknown to more northern lands. Here is a bunch of bamboo trees,—and there, a tree called the coco-bolo. The wood of the latter is very hard and beautiful. Considerable quantities of it are shipped annually to the United States. Per-



"THE NATIVES CLIMB FOR THEM."

haps, if we should ask someone who knows, we should find that the handles on our knives are often made of coco-bolo. Fine cedar and mahogany trees also furnish valuable timber, and a certain kind of palm nuts, called ivory nuts, are shipped away to be made into buttons.

NEGROES WITH COCOANUTS.

In the United States elms, maples, pines, and oaks are the most common and beautiful trees. On the Isthmus their places are taken by the palm trees. Along the roads and in the parks and gardens we shall see the royal palm lifting its graceful branches on a slender trunk high into the air. This palm bears no fruit and is useful only for ornament or shade. But the cocoanut palm is both ornamental and useful, for its nuts are collected by the natives to be sold or used as food. Several million cocoanuts are sent to our markets at home each year. No doubt we have many times eaten Panama cocoanuts. Here we shall see how they grow. All over the Isthmus are cocoanut palms, both wild and cultivated, in great abundance. They seem much like the royal palms in

Palm Trees

"HEAVY BUNCH OF FRUIT."

shape but are not usually so tall. Up there, underneath the fronds or branches and close to the trunk, we can see a bunch of half a dozen or more large, oval-shaped objects. They look like great, dark-colored eggs. Each is a cocoanut wrapped in a thick green covering or husk, much as chestnuts are wrapped in the burs. When partially ripened the cocoanut shell and husk are soft pulp and the interior is full of a rich, sweet milk. It is then that the natives climb for them. The picture shows three cocoanuts in husks on the shoulder of one negro, while the other negro is cutting away the husk and soft shell in order to get at the delicious milk. When the cocoanuts are fully ripe, they drop from the trees. The husk is then dry and can be easily torn off and the cocoanut at last appears as we are accustomed to see it in our fruit stores.

Bananas

There is also a tree-like plant that is sure to give us a surprise. It grows to the height of fifteen or twenty feet, with a soft trunk marked with purple stripes, and with immense broad leaves often six feet long. There is nothing in our northern climate that seems at all like it. But if we look closely, a heavy bunch of fruit, on a thick stem, hanging near the trunk, easily marks it as the banana plant. Curiously enough the bunch of bananas seems to be upside down, and the stem continues beyond the fruit like a long snake and ends in a sort of blossom much like a large water-lily. We soon realize that this is the natural way in which the banana grows, and that it is not on

NEGRO WOMEN LOADING BANANAS ON STEAMER.

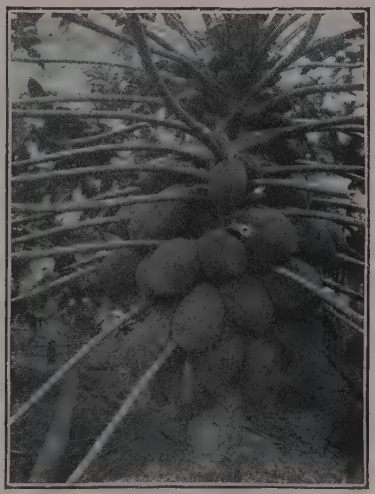
the trees but in our stores at home that the bunches are hung upside down. When the fruit is ripe enough, the natives chop off the stem near the fruit, the long, snaky end is cut away, and the fruit is ready for market. In Panama

Field of Pineapples on Taboga Island Near City of Panama.

a bunch is sold to the fruit dealers for about thirty cents. Nearly four hundred thousand bunches have been shipped north from Colon in one season, and thousands more are used on the Isthmus for food. Of late years, however, bananas are shipped from Bocas del Toro instead of from Colon.

In Panama, too, grow delicious oranges, papayas (a fruit

similar to melons but grown on trees), pineapples, limes, bread-fruit, mangoes, and scores of other tropical fruits with which we are less familiar. Nature has been very generous here with her fruits, —so much so, in fact, that the natives can live on them with little or no effort. But the cocoanuts and bananas are the most abundant and most characteristic of the Isthmus.



PAPAYAS.

A Panama poet has written an interesting little poem which describes the land in which he lived. The first stanza of the poem is at the beginning of this chapter. It would be easy to learn and might help us to remember some of the more important things that we shall notice on a visit to Panama.

CHAPTER VI

NATIVES AND ANIMALS

Where vegetation grows with such great luxuriance, we are not surprised to find also an abundance of animal life. We have, no doubt, already noticed the great black vultures sailing about far up in the sky. And everywhere among the trees we come upon countless numbers of birds of all sizes and bright colors. The most noticeable are the gayly colored parrots and their relatives the brilliant-crested cockatoos. By the swamps and streams are the pelicans and great blue herons. But we shall find the forests strangely silent and shall miss the song birds that make glad our northern woods and fields. It seems to be almost a rule

PANAMA HUMMING BIRDS.

with birds and flowers that the more brilliant the plumage or coloring, the less is there of pleasant song or perfume.

As we pass on through the jungle a timid deer may here and there be seen. There are snakes, too, numerous and poisonous, and we must have a care lest we be seriously bitten. But in these woods there are no animals of large size, like the lions or elephants or other great game of Asia and Africa. Unless one of us were alone and without a gun, he need have no fear.

"Snakes, Too, Numerous and Poisonous."

The largest and most dangerous animal is the jaguar. It can sometimes be found even as far north as Texas and inhabits the woods and jungles of all Central and South America.

The Jaguar

This jaguar is the largest of the American wild animals of the cat family and sometimes grows to be ten feet long from nose to tip of tail. It is a sort of cousin of the leopard or panther of Asia. If we can imagine a cat as large in body as a Newfoundland dog but with short yellowish-brown hair and a long tail, and marked all over its body with dark rings and spots, we shall have

some idea of the appearance of a jaguar. We shall not see any of these animals. They are too sly and cunning. Only the most careful hunter could come within gunshot of one of them. At times a jaguar will come out of the woods to attack a herd of cattle, but more often it feeds on monkeys and tapirs.

An interesting little animal called the warree can at times be seen in the Isthmian jungle. It is a species of wild hog.

The Warrees

The naturalist Godman writes of this animal: "The warrees go in herds of fifty to one hundred. They are said to assist one another against the attacks of the jaguar, but that wily animal is too intelligent for them. He sits quietly on a branch of a tree till the warrees come underneath, then jumping down kills one by breaking its neck, leaps up into the tree again, waits there until the herd departs, when he comes down and feeds on the slaughtered warree in quietness."

"It is a Species of Wild Hog."

The warree is black in color, except that its lips and jaw are pure white. It is about forty inches long, with short but nimble legs. Very large tusks and a coarse fur of stiff, strong bristles give it a fierce appearance. Close acquaint-

ance with this little wild hog is not always agreeable. Mr. Temple, former Chief Justice of Belize in Central America, says:

"If you meet a flock of warrees in the bush and take no notice of them, it is probable that they will take no notice of you, but if your intentions are hostile and your design is to transfer one of them from his native wilderness to your kitchen, you must take care to place yourself in a safe position before you carry your design into execution. A gentleman not long since shot a warree without having taken the necessary precautions. The remainder of the flock instantly pursued him, and if he had not managed to climb into a tree he would have been torn to pieces. But he was kept a prisoner in that leafy asylum for many hours, the surviving warrees being bent on revenging the death of their companion. Even when the flock went a little distance to feed, they left two or three to stand guard at the foot of the tree."

Perhaps we may have the good luck also to see some Panama monkeys. In the continents of North and South America monkeys are not so common as in the Eastern Hemisphere. They are found in abundance only from Panama to Brazil.

Monkeys

Years ago there were great droves of monkeys, both black and white, in the Panama woods. Now there are not so many left. Away back in the year 1681 Captain Dampier, an English pirate like Henry Morgan, crossed Panama.

He had been a great traveler and had seen monkeys in many other parts of the world. It is interesting to read in his diary a description of the Panama monkeys of his time. They are much the same to-day.

"Years Ago there were Great Droves of Monkeys."

He said,—"The monkeys that are in these parts are the ugliest I ever saw. They are much bigger than a hare, with a black, hard skin; but the upper side, and all the body is covered with coarse, long, black hair. These creatures keep together twenty or thirty in a company, and ramble over the woods, leaping from tree to tree. If they meet with a single person they will threaten to devour him. When I have been alone I have been afraid to shoot them, especially the first time I met them. They were a great company dancing from tree to tree, over my head, chattering and making a terrible noise, and a great many grim faces, and showing antic gestures. Some broke down dry sticks and threw at me. At last one bigger than the rest came to a small limb just over my head, and leaping directly at me made me start back; but the monkey caught hold of a bough with the tip of his tail, and there continued swinging

to and fro, making mouths at me. At last I passed on, they still keeping me company, with the like menacing postures, till I came to our huts.

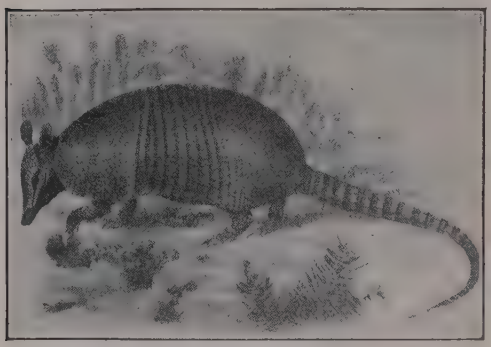
"The tails of these monkeys are as good to them as one of their hands, and they will hold as fast by them. The females with their young are much troubled to leap after the males, for they have commonly two; one she carries under one of her arms, the other sits on her back, and clasps its two fore-paws about her neck. These monkeys are the most sullen I have ever met with, for all the art we could use would never tame them. It is a hard matter to shoot one of them so as to take it; for if it gets hold with its claws or tail, it will not fall so long as one breath of life remains."

This same Captain Dampier was much interested in another curious Panama animal. The Spanish discoverers called it the armadillo, because it was protected by a thick-jointed shell, like a suit of armor. It is a funny little creature that looks like an opossum with a shell on its back. Dampier describes it as about the size of a "small sucking pig,—the body of it pretty long."

The Armadillo

"This creature," he said, "is enclosed in a thick shell, which guards all its back, and comes down on both sides, and meets under the belly, leaving room for the four legs; the head is small, with a nose like a pig, a pretty long neck, and can put out its head before its body

when it walks; but on any danger he puts it in under the shell; and drawing in his feet, he lies stock-still like a land turtle. And though you toss him about he will not move himself. The shell is jointed in the middle of the back; so that he can turn the fore-part of his body about which way he pleases. The feet are like those of a land turtle, and he has strong claws wherewith he digs holes in the ground like a coney."



"The Spanish Discoverers Called It the Armadillo."

"According to an old Mexican legend, the armadillo was sent in direct answer to the prayers of the devout people who long ago resided in a part of Mexico which was badly infested with venomous snakes. The inhabitants so beseeched the Almighty for relief that suddenly all the serpents seemed to have vanished from the earth. In going about the region once so badly plagued the natives could find no more opossums, but instead an animal that seemed to be one, except that on its back was a shell. This was its armor which brought immunity from the bite of a snake, and thenceforth the armadillo began to make unrelenting warfare on all poisonous reptiles. It is still true to its

reputation, and wherever found is on the job of snake killing, as it was centuries ago in Old Mexico.

"Native hunters usually track them to their burrows with dogs, which give notice if an occupant is at home. The hunter then using his bush-knife as a pick, and his hands as a shovel, commences with the utmost dispatch to dig out the animal, which all the while endeavors to escape by scratching deeper into the ground. It is a race between the armadillo and the man, and an even chance which succeeds. The tail is the first part seized by the hunter, and then after a short struggle, the victim succumbs. The flesh of the armadillo is tender, white, and usually esteemed a delicacy."

The flesh of the tapir also is used for food by some of the Indians in various parts of Central America. This animal is common in the jungle of Panama, though here the San Blas Indians seldom hunt for it. Like the armadillo it is very different from any animal with which we are familiar in the United States. In fact, it is seldom found even as far north as the City of Mexico.

The Tapir

"A Native of Panama."

Neither is it to be seen in most parts of South America. So that we may think of the tapir as more truly a native of Panama and the nearby countries than any other animal in the jungle.

It is a small, fat, slow-moving animal, about two feet tall and four feet long. The color is blackish-brown, lighter on the head and passing into pale brown on the cheeks, the edges of the lips, and the tip of the ears.

Panama Water Lizard.

The tapirs are hunted usually during the rainy seasons, when they come down from the hills into the low valleys to feed on the coarse grass by the river banks. Dogs run them down for the hunters and they are then shot or killed with spears.

Though the various animals of which we have been speaking can all be seen in the Panama woods by those who have the time to spare to look for them, the casual traveler who passes from Colon to Panama City may not see them at all. But it would not be difficult for anyone to see the alligators that are common in nearly all the streams and rivers.

Alligators

If we had time to spare and wanted a little excitement, we might join an alligator hunt. These dirty beasts inhabit

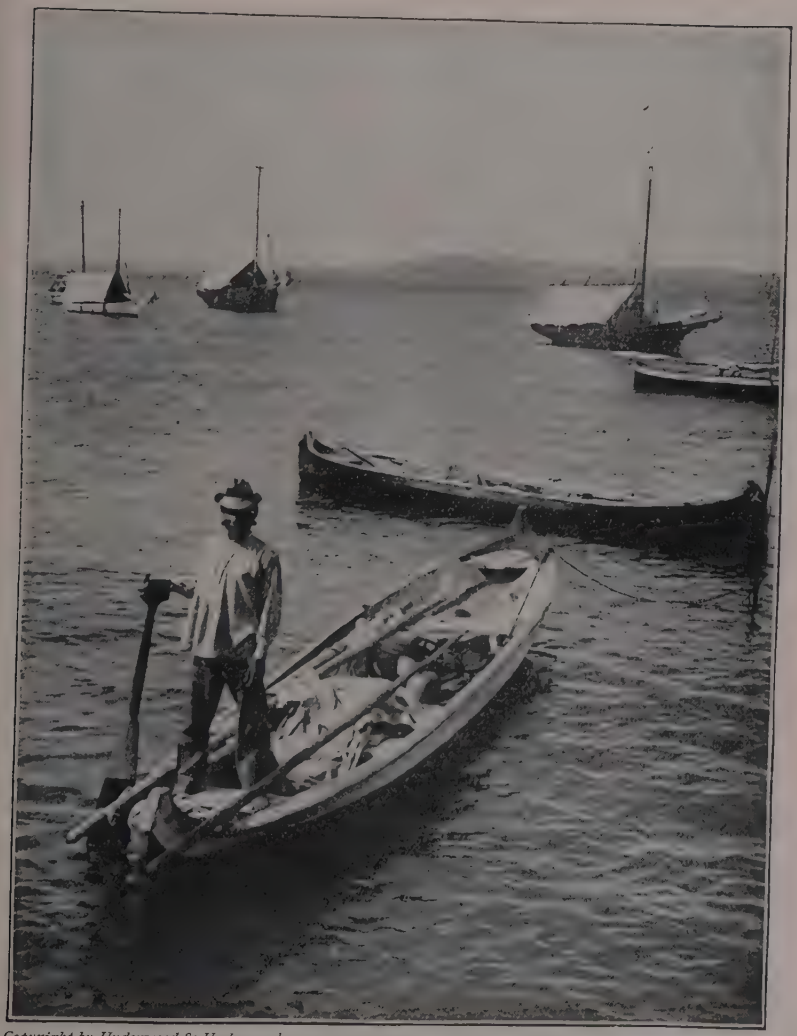
"We Might Join an Alligator Hunt."

the swampy streams and can often be seen as they sun themselves upon the banks. They lie there motionless, much like old rotten logs half buried in the mud. If anyone of us made a mistake and jumped out on one, his visit to Panama

Length of Nearest Alligator was 18 Feet 6 Inches. Sticks in Mouths About 30 Inches Long.

might come to a sudden end then and there. Wise people keep away from these animals, unless heavily armed and accustomed to their tricks.

Probably by this time we should be glad if it were as easy to escape from all the dangerous and troublesome animals on the Isthmus, as it is from the alligators.



"IN THE HARBOR OF COLON WE MAY SEE SOME OF THE SAN BLAS INDIANS."

"My touch is light and downy,
They know not I am there
Till ZIM! what howls and curses!
'Tis laughable I swear!"

So says the Panama mosquito,—at least the Panama poet tells us that he does. It may be laughable,—for the mosquito. But when we see with what care the houses are screened against this little pest, and learn that one sort of mosquito carries in its sting the germs of the dreaded Yellow Fever, we shall come to think of this tiny insect, as, in many ways, the most dangerous in Panama. The bites of fleas and sand flies are bad enough, and there are many of them; but the bite of some Panama mosquitoes may mean death.

Panama Mosquitoes

We can see now that the wild animals of the Isthmus are many of them as different from the wild animals of the United States, as are the trees and fruits different from our own. We shall also see that the people themselves are quite as different.

We have spoken of the population of Panama as about 350,000. The white inhabitants are a small part of this number. Of these there are some Americans, some Europeans, some Chinese, and many of old Spanish blood. These form the better class and live for the most part in the towns. Below them are the "natives," so called. This class is made up of the San Blas Indians, descended from the Indians of Balboa's time; the

The People

NATIVES IN A BOAT MADE OF A SINGLE LOG.

negroes, many of whose ancestors came to Panama as slaves in the old Spanish days; and a great number of dark-skinned people of part Spanish, part Indian, and part negro blood.

In the harbor of Colon or during our journey across the Isthmus we may, perhaps, see some of the San Blas Indians. There seems to have been a number of large Indian tribes in Panama when the Spanish first conquered it. One authority puts the total number of Indians at that time as high as 2,000,000. But the long years of Spanish cruelty and bloodshed were very hard on them and roused a most bitter hatred of the whites.

Their homes are many miles away from Colon in the forest country in the eastern part of Panama. But they are occasionally seen near the towns, when they bring in nuts and fruit to trade for the necessities of life. Some stories told of them show that they are still treacherous and still hate the white people.

We may take as an example the fate of an expedition of 1854, led by Lieutenant Strain of the U. S. Navy. In January of that year three warships were sent to Caledonia Bay in the Gulf of Darien, for the purpose of exploring and surveying the country. A party of twenty-seven men, led by Lieutenant Strain, was landed. "The start was made from Caledonia Bay, on the 20th of January, with the intention of crossing the Isthmus to the Gulf of San Miguel on the Pacific coast. At first the Indians were friendly, or appeared

"Some Must Be Caught and Held Before the Camera."

to be so, and served as guides; but after a few days they deserted the surveying party in the depth of the tropical wilderness. The party then became hopelessly bewildered,

Native Charcoal Burners, Huts, and Families.

the food supply failed, and one third of the number perished from exposure and starvation. After ninety-five days of terrible suspense and suffering, Lieutenant Strain and two or three others made their way to the Pacific, were rescued by a friendly Spanish native, and taken to Panama. The other surviving members of the sorrowful expedition at last returned to Caledonia Bay in complete exhaustion. Lieutenant Strain died, and his remains were buried at

Colon, to be afterward exhumed and taken to the United States."

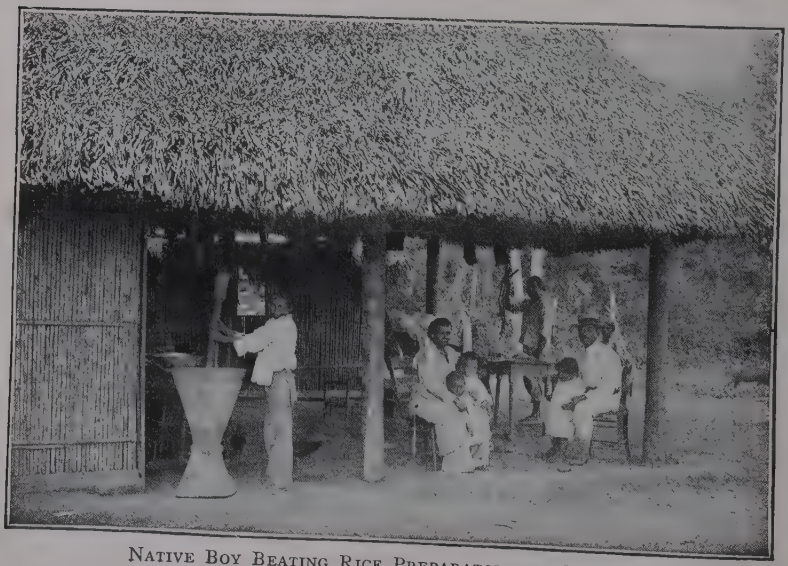
As for the negroes, some live a life away off in the forests almost as wild as the Indians. They are not at all dangerous. Indeed, they are so timid as to be hard to photograph. Some must be caught and held before the camera.

The natives in the towns or in their little settlements nearby are better clothed and housed and are an interesting

"Busting Buttons"—Panama Women Washing by the Chagres River.—Note the Thick, Heavy Club with which the Wet Clothes are Beaten.

and intelligent people. But life is so easy for them on the Isthmus, that they are poor workmen and inclined to be very lazy and shiftless. What queer little thatched huts they

NATIVE HUTS.—NOTE THE COCOANUT PALMS.



NATIVE BOY BEATING RICE PREPARATORY TO COOKING.

build! Surrounded by groves of cocoanut palms, they are picturesque enough, but scarcely such places as we should care to live in. The principal food of the natives consists of fruit and fish. Both salt-water and fresh-water fish abound. Yams, yucca, plantains or bananas are always at hand. Rice is also a regular article of diet. It is bought in small quantities and pounded into a sort of meal in a large wooden mortar. Little or no meat is eaten, and it is easy to see that the food is not strengthening enough to give the natives much energy. No wonder that they do not care to work!

CHAPTER VII

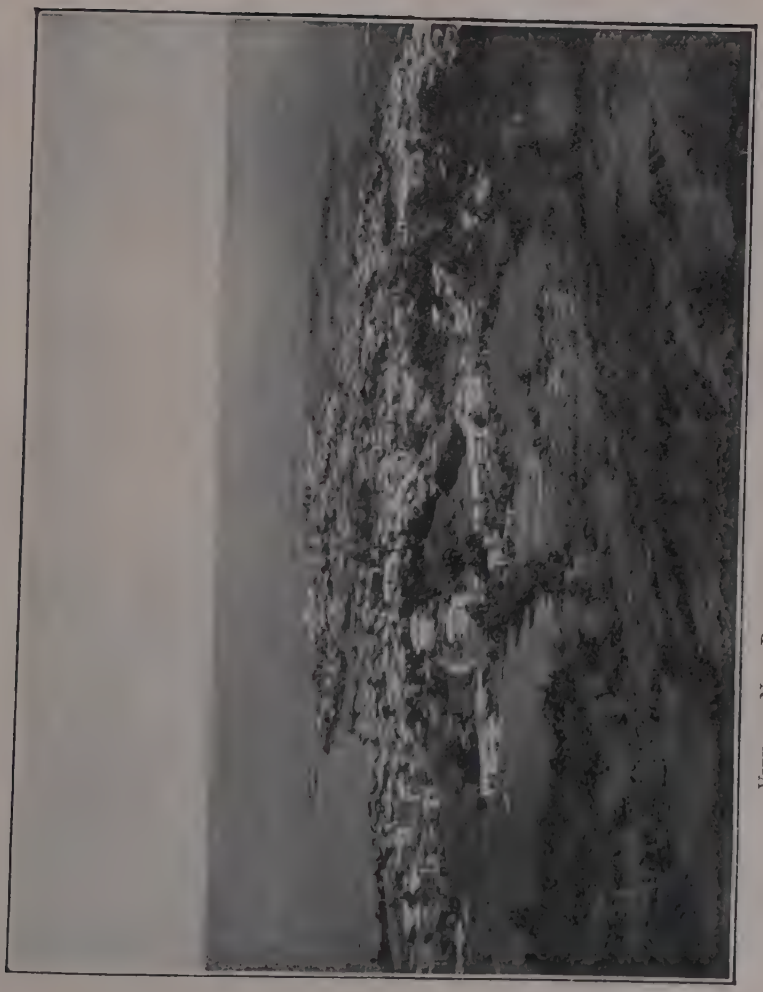
CITY OF PANAMA

And so we have made our way across the Isthmus, through the forest jungle and the native villages, until the Pacific and the City of Panama come into view.

Before entering the town, let us get a general idea of its location and surroundings from the slopes of Ancon Hill, which rises directly behind it. How superb is the view here spread out before us! Below is the little city, scattered over a rocky point of land,—and there, the broad and beautiful Gulf of Panama framed in green hills. Away off in the distance the Pearl Islands can just be seen, while near at hand Taboga and its neighboring islands rise abruptly from the blue waters of the bay. And over all are bright skies and brilliant sunlight. We shall travel far before finding a city more attractively situated.

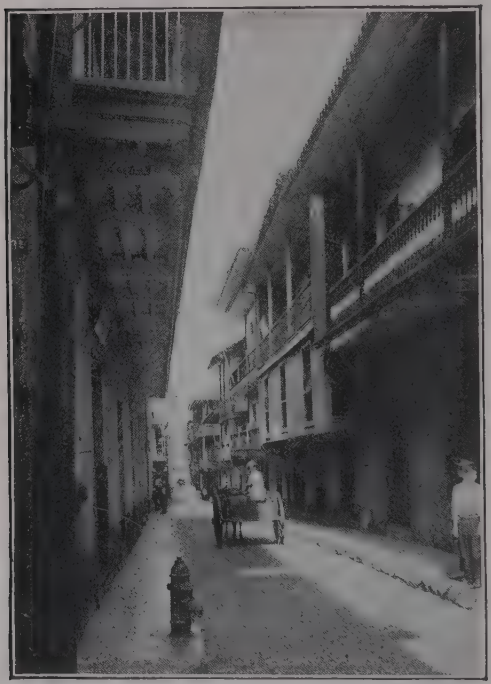
Even from a distance the town has a foreign appearance, and a closer view adds to this impression. How strangely narrow its streets are! And see,—how the curious old Spanish balconies project over the sidewalks and protect the passer-by from the sunlight! At least the lower parts of the houses are very heavily built, with few windows and these strongly barred,

Foreign Appearance



View of New Panama and the Pacific from Ancon Hill.

as if to stand a siege. No lawns separate them from the streets. It is but a step to the sidewalk. Doors are open everywhere. The interiors of the houses of the poorer people are in full view from the streets. We shall find, however, that the homes of the better class are in the second story of their houses and more removed from the noise and dirt.



"How Strangely Narrow Its Streets Are!"

Let us pass directly into the town to Independence Plaza. Here stands the old Cathedral of Panama,—with its twin spires, Spanish architecture, and clanging bells. In front of it is the open park or Plaza. This is the center about which the town is built. The chief hotel, the Bishop's palace, the City Hall, and the principal clubs, are all on this Plaza. Here, on Sunday evenings, rich and poor alike gather to listen to

The Plaza

the band concerts or to promenade beneath the lights and palm trees. For more than two hundred years this Plaza has witnessed some of the most important events in the history of Panama. If the City of Panama is the capital of the Republic, this small square is its very heart. There are other old churches and other parks in the city, but none quite so interesting as these.

Not all the town, however, is as attractive as Independence Plaza. Though it has now been made thoroughly clean and healthful, it was once an unsanitary, tropical city, and the old conditions are not entirely changed. Yet our general feeling, as we examine the town, will not be unpleasant.

CALLE BOLIVAR, ONE OF THE BETTER STREETS OF PANAMA CITY.

From the Cathedral Plaza it is only a short walk to the harbor. A stroll out on the old sea-wall is full of novelty and interest. This is the very same wall which the Spaniards

PANAMA CATHEDRAL AND CORNER OF INDEPENDENCE PLAZA.

Two towers the old Cathedral lifts
Above the sea-walled town.
. . . . . .
In either turret, staves in hand,
All day the mongrel ringers stand
And sound, far over bay and land,
The Bells of Panama.

built to protect the town in the old pirate days. They must surely have expected Henry Morgan to return with his blood-thirsty pirates, so thick and high did they build it. In fact, so much money was spent upon it that the angry Spanish king is said to have asked if it were not built entirely of silver. Only portions of the old walls now remain.

At Colon the tide rises and falls less than two feet,—that is, the surface of the ocean always remains at about the same level. At Panama, on the other hand, the tide rises and falls nearly twenty feet. During one part of the day we may see the city wall at high tide and with numbers of small fruit and fishing boats anchored near it. The same spot at low tide would scarcely be recognized. The vessels are lying on dry bottom and their cargoes are being unloaded. From up and down the coast all manner of fruits are brought in these boats, and when the tide is out, the "beach market" makes an odd sight.

Beach Market

Old Cathedral Bells, Panama City.

Panama Hats

At home we most often hear the name of Panama connected with the soft, beautifully-woven hats, so common in summer weather. Some of us may have been looking curiously into the native huts or into the city houses, in the hope of seeing the people at work on these hats. They can be seen in most of the curious little stores, but where are they made, we ask. Not at all in Panama, is the reply, but away off on the west coast

The City Wall at High Tide.

of South America, in Ecuador. The Panama merchants buy them from that distant country, and then they, in turn, sell them to our hatters in the United States. They might

more truly be called Ecuador hats. The name "Panama hat," then, refers not so much to the place where they are made as to the particular kind of material and weave of

THE SAME SPOT AT LOW TIDE.

the hats. Indeed, many people suspect that the cheaper kinds of Panama hats are made even in Paris or New York.

We cannot stay long in the city without realizing that the customs of the people are in many ways as foreign to our own as the city is foreign in appearance. Sensible people will not, perhaps, think any the less of the Panamanians for that. The clanging of many church-bells will not al-

Beach Fruit Market.

Office of the Panama Lottery.

ways mean much church-going. And some of us may be shocked to find cock-fighting and an occasional bull-fight on Sunday.

We have already learned that in December, 1903, Panama became an independent nation, free from Colombia, of which country she had so long been a part. Now the little Republic, made up of seven provinces, has a constitution and form of government similar in most respects to our own. It has its own stamps, coins, flag, government buildings, etc., and has the peculiar advantage of the special protection of the United States.

Among the leaders who brought about the revolution of 1903 and freed Panama from Colombia none was more prominent than Dr. Manuel Amador Guerrero. He was a native of Cartagena, Colombia, but had resided for more than fifty years on the Isthmus and had become one of Panama's most distinguished citizens. When the National Assembly met in 1904, he was chosen, by unanimous vote, the first president of the new Republic. His term expired on September 30, 1908. On May 2, 1909, he died at his home in Panama City at the age of seventy-seven years. Our government has honored his memory by naming the fortifications at the Pacific end of the Canal Fort Amador.

Dr. Amador

During the first four years of the young Republic's life there was much uncertainty and some disorder. Party feeling was very strong and rival politicians of the Con-

servative and Liberal parties began to show the same revolutionary spirit that has characterized many South and Central American states. To the United States it was highly important that peace, order, and justice should prevail on the Isthmus. Canal building could not well go on in a country that was disturbed by strife and bloodshed. Dr. Amador's high character and good judgment, coupled

President Obaldia and Wife in Front of Presidential Palace.

with strong pressure from the United States, guided Panama safely through these early years and established traditions of good and stable government.

The second president of Panama was José Domingo de Obaldía. He had been Second Vice-President under Dr.

Amador until 1906 and First Vice-President from that time until Amador's death. He was inaugurated President on October 1, 1908. "He was born in David, province of Chiriqui, on January 30, 1845. His father was at one time President of Colombia, and his mother was of distinguished Panamanian family. On completing his education at the Colombian college at Bogota, he entered the employ of the Panama Railroad Company, and after a short service, went to the United States, where he took a two years' course in a school in New Haven, and learned to speak English. Returning to Panama, he went into the cattle business in Chiriqui, in which he made a small fortune."

"In 1900 he was sent to Bogota to represent Panama in the Colombian Congress, and in 1903 was elected Senator. Later in the same year he was appointed Governor of Panama, which office he held at the time of the revolution in which Panama separated from Colombia, in November, 1903. Under the new government he was appointed Minister to Washington, and later, in 1908, was made Liberal candidate for the presidency and elected in July of that year."

Obaldia

President Obaldia did not live to complete his term. His death occurred on March 1, 1910. Vice-President Dr. Carlos A. Mendoza took the oath of office on that day.

Obaldia was President during two of the busiest years of canal construction. His administration was marked by the same orderly government established by Dr. Amador.

PART IV

KEY TO THE PACIFIC

CHAPTER VIII

ROADWAYS ACROSS CENTRAL AMERICA

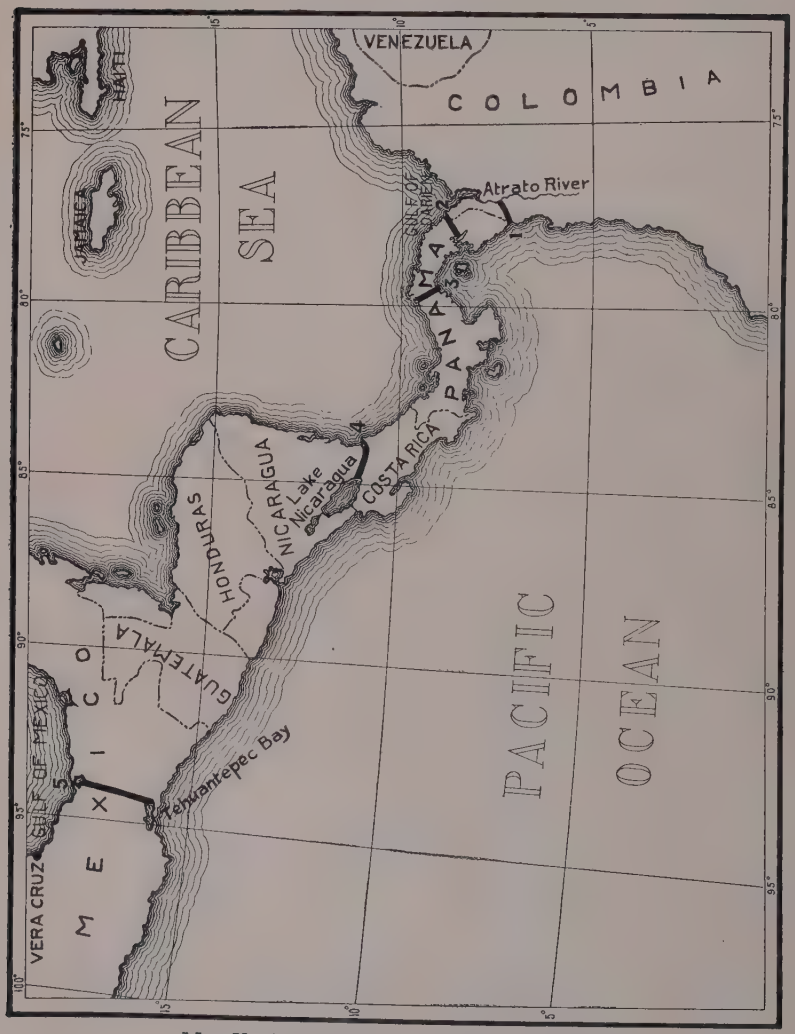
If we made a visit to Panama merely to see a tropical country in many ways so very different from our own, and to look upon the ruins of the glorious old days of Spanish rule, we should certainly be well rewarded. But, as everyone knows, there is something else to be seen at Panama. It has been said that the eyes of the whole world are now turned with tremendous interest to this little country. During the remainder of our stay in Panama we shall try to learn why this is so.

We begin with the story of a most remarkable little railroad. While at Panama we shall be obliged to travel considerably on this road, and a knowledge of its history will add much to our interest.

An Odd Railroad

There was a time, as late as the year 1889, when tickets for a forty-eight mile railroad journey at Panama cost $25 in gold,—or more than fifty cents per mile. If we paid the same rate at home, it would cost more than $200 to go from New York City to Buffalo or from Chicago to Minneapolis. Few persons could afford to take many such trips. The rates at Panama are still very high.

We shall notice that all the telegraph poles along the road



MAP V.—ROUTES ACROSS CENTRAL AMERICA.

are of iron instead of wood, and if we get out, when the train stops, and look carefully at the cross-ties beneath the rails, we shall find that they are all of lignum vitæ, almost the hardest wood in the world. It is next to impossible to drive a spike into these cross-ties. Holes for them must be bored

PEDRO MIGUEL.—PANAMA RAILROAD.

out. And this is, of course, a long and expensive task. It is odd to think that all this trouble was made necessary by harmless-looking ants. We have heard of beavers cutting down young trees with their sharp teeth, in order to eat the tender twigs and leaves or to use the branches in building their mud houses. But that ants will eat dry, hard telegraph

poles and railroad cross-ties seems like a fairy story. We may smile at the idea, but it is true nevertheless. In the forests of Panama there are great colonies of wood-eating ants that will eat into and destroy any but the very hardest wood. Iron and lignum vitæ, however, have proved too much for them.

The story of the building of the Panama railroad takes us back again, for a moment, to the early Spanish times. When all that long stretch of land between North and South America which we call Central America (Map V) was discovered and conquered by Spain, and the rich west coast of America fell into her hands, the Spaniards naturally began to look for the best places for roadways across from the Atlantic to the Pacific.

Balboa's Road

We remember that Balboa, in 1514, cut a rude road across the Isthmus through the jungle and carried his ships over it. It is marked as No. 2, Map V. This was the first roadway built by white men between the two oceans. It was also, by chance, the shortest,—about thirty miles. But no towns grew up at either end and it soon disappeared.

Panama Road

When Governor Pedrarias built the City of Panama and the towns of Nombre de Dios and Porto Bello, he began a good, paved road between them (No. 3, Map V). This road was fifty miles long and was wide enough to allow two carts to be driven abreast along it. No expense was spared to make it a good highway for travel and commerce.

In 1525 Cortes, the Spanish ruler of Mexico, found that from the Gulf of Mexico across to Tehuantepec Bay (Tā-wän-tā-pek′) was but one hundred and twenty miles and that the passes through the mountains were but nine hundred feet above the sea. So he built a highway at this point (No. 5, Map V), known as the Tehuantepec Road. From that day to this an extensive trade has been carried over that route.

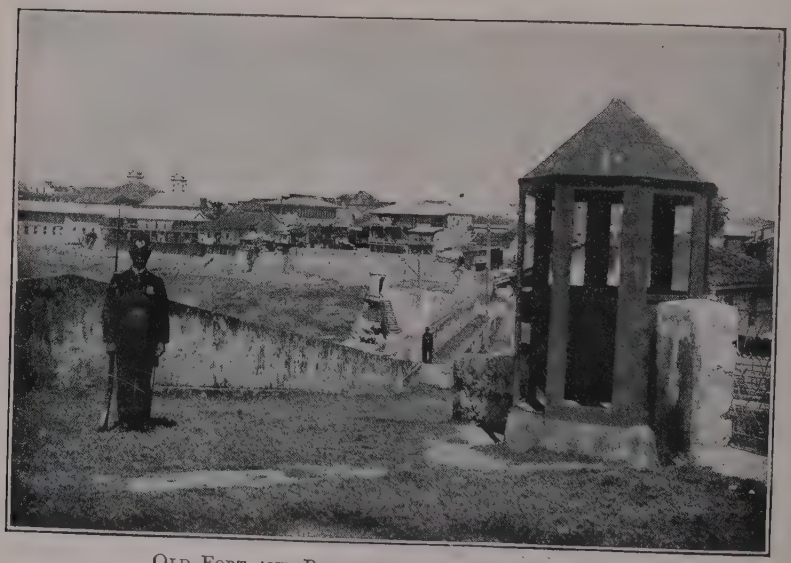
Tehuantepec Road

During all the long years that Spain held it, and for many years after, the Tehuantepec and the Panama roads were the only important routes across Central America. There are men still living who crossed by these roads, when no others existed.

There came a time, however, when a better road was greatly needed. We have all heard of the war between the United States and Mexico in 1846 and 1847, which gave to the United States New Mexico, Arizona, and California, and much other land besides. At that time there were less than nine thousand miles of railroad in all the United States, and it was impossible to go from New York even as far west as Chicago by rail. Many hundreds of miles of unexplored prairies and Rocky Mountains lay between Chicago and California. The trails for horses and wagons were very dangerous, the journey required several months, and hostile Indians were everywhere. For government service, for soldiers, and for the mails an easier route was necessary.

The Panama Railroad

We have all heard, too, of the wonderful discovery of gold in California in 1848, and of the crowds of excited men who rushed to the new gold fields. Long caravans of horses and wagons conveyed thousands west from St. Louis. But there were thousands more of the Forty-niners,



Old Fort and Portion of City Wall, Panama.

as they were called, who chose to go by ship to the mouth of the Chagres river, then to cross the Isthmus to the City of Panama, and thence by ship again up the Pacific coast to San Francisco. There were quite as many dangers by this route as by the long trails across the western prairies. There were many shipwrecks on the rough Caribbean sea,

and hundreds fell sick and died in the hot climate of the Isthmus. In the single year of 1852 five hundred gold-seekers died of cholera at Panama.

At that time there was no regular line of steamers from Panama City to San Francisco. When a ship once reached California, the crew was likely to be seized with the gold fever and to run off to the mines, leaving the captain with no one to help him take his ship back to Panama. Had we searched carefully, as we took a promenade on the old sea-wall of the City of Panama, we might have found many names and initials of the Forty-niners cut in the moss-covered stones. These letters tell a pathetic story of the anxious men who once, from these very walls, looked eagerly out to sea in search of a returning ship. The long days of waiting, the empty purses, the dreaded fever made Panama the grave of hundreds, who were never to reach the gold mines. A large trade sprang up on the Isthmus, and great quantities of goods were shipped over this route to California.

The Forty-niners

So it came about that a company of men in New York city determined to build a railroad from Colon to the City of Panama. William Henry Aspinwall, John L. Stevens, and Henry Chauncey were the leaders in this enterprise. The right to build it was secured from the government of Colombia, the route was surveyed not far from the old Spanish roadway, and work was begun in 1849.

Since the road was to be but forty-eight miles long and there were no mountains to be crossed, it would not seem, at first thought, like a great task; but in the end it proved to be one of the most disastrous attempts at road building in which American energy and bravery have ever been engaged.

American Energy and Bravery

There were many obstacles at the outset. Panama was a long distance from railroad supplies. Materials were

Haut Obispo Station.

hard to get. Then there were the jungles to be conquered. It will be almost impossible for us to realize the difficulties that they present to an engineering party. We

are told that a party of engineers twice passed within twenty feet of a high hill without knowing it, so dense was the tropical growth.

To begin the engineering work, Colonel G. M. Totten, James L. Baldwin, and a few others, with a small number of native laborers, landed on Manzanillo Island, where now is the town of Colon. "There was not the least sign of human life, civilized or savage, on the island; nor was there a space of dry land upon which to set foot, except the narrow ridge of sand that had been washed up by the surf along the reef. In front, the sea; behind, the malarial swamp. But they set to work to clear away a space for the purpose of erecting a building to shelter themselves, their followers, and their supplies from the sun and rain.

Colonel Totten

"They had a schooner of two hundred tons, upon which they had arrived, and on which they lived for the first few months. Even after the first house was completed it was found that it was impossible to occupy it, on account of the swarms of mosquitoes, sand flies, and other noxious insects that invaded it; while on board the vessel the men were tormented with myriads of cockroaches, which rendered life a burden. Sickness was seldom absent from the camp, while death was a too frequent visitor. No one escaped the calentura, as the jungle fever is called. In a little time the white members of the party were the pale hue of ghosts; and even the dusky

natives grew many shades lighter than their natural bronze.

"Under these untoward circumstances, at the beginning of the long rainy season, of which no one of the company, except the natives, had any practical knowledge, was

Scene on Panama Railroad.—Bolivar Street, Colon.

commenced the battle with tropical nature that was to end in triumph five weary years later."

James Baldwin was selected to survey the line of the road. "He organized a small party, and made the bold plunge. For a long distance they were obliged to wade in water waist deep, and to hew their way through the dense

jungle. It is said that Baldwin carried his noonday luncheon in his hat, during the progress of that part of the survey, and ate it standing amid envious alligators and water snakes. Be that as it may, it is doubtful if a more daring feat of engineering has been performed. Think of it! day after scorching day, shut in by impenetrable growth of jungle, each weary foot of which must be cut down before any advance could be made, breathing air laden with poison, and tormented by millions of insects! The wonder is that any man could have had such courage and endurance."

James Baldwin

Not far from Colon was the great Black Swamp. Across this it was necessary to build the line. Some of us may know what that means. For miles no hard bottom could be found beneath the soft mud. Tons on tons of rock were dumped upon it and in a few hours sank out of sight. This swamp was obstacle enough to force less determined men to quit the work.

Obstacles

The next obstacle was the Chagres river. The route of the line crossed it at several points and there the terrific floods made railroad building next to impossible. The water often rose ten feet or more above the tracks and swept away the results of months of labor.

Another obstacle was the difficulty of securing good laborers. The Panama native has a way of working one day and then of loafing for the next week. When he works, he does not accomplish much. So laborers had to be imported

from abroad. The Company, as an experiment, brought over a shipload of eight hundred Chinamen. "They immediately began to fall sick. In less than two months after their arrival there was hardly one of the original number fit to wield a pick or shovel. They gave themselves up to

Floods on Panama Railroad—1906.

despair and sought death by whatever means came nearest to hand. Some sat on the shore and awaited the rising tide, nor did they stir until the sea swallowed them. Some hanged or strangled themselves by their cues. The remnant, fewer than two hundred, sick and useless, were shipped to Jamaica."

Irish laborers were tried with no better results. Finally a gang of several thousand negroes from Jamaica, and a few whites from various sources finished the work.

We may already suspect the greatest enemy with which the railroad had to fight. More serious than all other obstacles to any great work in Panama is the tropical climate with its tropical diseases. Not only does the steaming hot weather suck the strength out of men who are accustomed to cooler lands, but it leaves them too weak to throw off the diseases that lurk in the filth of the cities and the deadly air of the swamps. Consumption, typhoid, malaria, plague, and yellow fever, cut down the railroad's workmen until the wonder is that the road was ever completed.

Disease

"Beyond the Chagres river
Are the paths that lead to death—
To the fever's deadly breezes,
To malaria's poisonous breath!"

It has been said that one life was sacrificed for every cross-tie on the railroad track. This is, no doubt, untrue. The total loss of life was about 2,500. It was a fight of American daring against terrible odds. But such engineers as Colonel George Totten and James Baldwin were superior to all the evil powers of the jungle, and the road was built.

Eight million dollars,—five years of exhausting labor,—

over two thousand lives,—that was the price paid for forty-eight miles of railroad away off in Panama.

On the 27th of January, 1855, a strange sight was seen in the City of Panama,—the first locomotive that ever crossed

"Here at Last Was a Railroad Across the Isthmus."

the American continent from ocean to ocean,—and this, too, fourteen years before it was possible to cross the United States by rail from the Atlantic to the Pacific.

First Transcontinental Railroad

Here at last was a railroad across the Isthmus. Shiploads of goods headed for the Pacific need no longer be sent on the long journey around South America. Commerce came to Panama at once. Even

before it was completed, the road had taken in more than two million dollars. It soon made fortunes for its builders, and has paid handsomely ever since. In the first forty-seven years this little railroad earned nearly $38,000,000 of clear profit for its owners.

Surely a railroad can have a story as romantic as the bloody career of a gang of pirates, even though led by Henry Morgan.

CHAPTER IX

WATERWAYS ACROSS CENTRAL AMERICA

In the first part of our story of Panama we learned that the greatest disappointment of Columbus's life was the fact that he could find no waterway through Central America to Asia. It will not be worth our while to study very carefully all the efforts made since his time by Spain, Scotland, England, and France to find or to build such a waterway. We are naturally more interested in what the United States has done at Panama. But we shall be more proud of our own country, if we see first what others have done and why they failed.

That Columbus failed to find a waterway did not entirely discourage the Spaniards. The more they learned of Central America, the more desirous were they to find or to build a way for ships through it. Columbus had been dead only fourteen years, when the Spanish king, Charles the Fifth, gave orders to all his governors in America to make a most careful survey for this purpose. His orders were obeyed and many explorers were sent out. Of course, no waterway was found. There wasn't any. And we need to follow the work of but one explorer. This was Gonzales.

Spanish Failure

He crossed the Isthmus at Panama in 1521 and sailed up the west coast to Nicaragua. Here a landing was made with one hundred men. Gonzales had gone inland a few miles when, to his surprise, he came to the shore of a great fresh-water lake. This was Lake Nicaragua. It is marked as No. 4 on Map V, p. 94 and it is very desirable that we should see exactly where it lies. The lake is one hundred and seventeen miles long, or about half as long as our Lake Erie, and covers three thousand square miles. Gonzales sailed up the lake to its outlet, the San Juan river, and then down this stream to the Atlantic. Here, surely, was an easy way from the Atlantic to the Pacific,—only one hundred and seventy miles and largely by water. It seemed as if a canal might be built at Nicaragua.

Lake Nicaragua

Spanish surveyors also declared, at this time, that a canal could be built across Panama. So, for a time, the Spaniards had high hopes of building a canal.

It was not long after this, however, that Spain came to feel that if easy ways across Central America could be found or built, other nations might steal away from her the rich possessions in the New World. So the Spanish king forbade any further surveys. And for two hundred and fifty years Spain did all in her power to prevent other nations from becoming interested in a canal at Nicaragua or at Panama.

But no one feared the anger of Spain, as we know from the stories of English pirates. Only a few years after Henry

Morgan destroyed Panama, a famous Scotchman named William Paterson planned to get possession of Panama by planting a large Scotch colony on the Gulf of Darien (Map V). He thought, too, that if the colony was a success, Scotland might dig a canal across the Isthmus at that point (No. 2, Map V).

Scotch Failure

What a pitiful failure it was! In 1698 twelve hundred Scotchmen set out in five ships and planted a colony at Darien. Others followed and everything looked promising. But they had not counted on the climate. Fever came, as it had done so many times before. Soon more than two thousand were dead and vast sums of money had been spent. Suddenly a hostile Spanish fleet appeared. The few survivors ran away in defeat to Scotland. There was to be no Scotch canal.

For more than one hundred years the failure of Paterson's plan discouraged any more such efforts. But interest was still alive in the idea of a canal and many people yet hoped to see it built.

English Failure

Some of us have seen, or may sometime see, a certain splendid monument in one of the squares in the city of London. Four massive lions guard a beautiful column which rises high in air. On its top stands the statue of the greatest admiral that ever walked the deck of an English battleship. All England delights to honor the memory of her great sea-captain, who died in his country's service.

Few persons know, perhaps, that twenty-five years before

"Four Massive Lions Guard a Beautiful Column."

his wonderful battle with the French fleet at Trafalgar, he nearly lost his life in Nicaragua. He was only young Captain Nelson then, and had been sent with some English ships and men to drive the Spanish out of Nicaragua and seize the lake. England had determined to get control of what was then thought to be the best route for a canal.

Nelson succeeded in whipping the Spanish ships that were sent against him. But the tropical fever again fought in behalf of Spain, and that he could not whip. The crew of his ship, the *Hinchinbrook*, was suddenly taken sick, and in a few days only ten were left alive out of two hundred. The captain's own health, also, was injured for the remainder of his life.

England did not despair. For many years she continued to make surveys at Nicaragua. Until very recently she still had plans for a canal.

CHAPTER X

THE FRENCH AT PANAMA

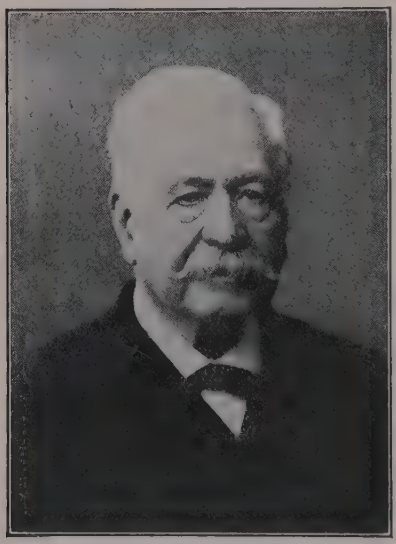
On a certain day in 1882, up among the hills eleven miles back of the city of Panama, an unusual sight could have been seen. All about, the jungle had been cut away, the land cleared, and tracks, cars, engines, and machinery for digging had been set up. Some of them were actually in operation. Engines were puffing, men were shouting, gangs of workmen were hurrying here and there. Smoke, too, could be seen at points down the valley, and there were signs of activity everywhere.

Amid all this commotion a company of a few hundred persons was gathered. No such company had ever met before on the Isthmus. There was the Bishop from the Cathedral of Panama, and with him a number of the leading citizens of that town. There were some Americans also, and Europeans of different nationalities, especially Frenchmen. These all had the appearance of spectators much interested in something unusual that was about to happen.

The center of the group was a little white-haired man, laughing and joking, and full of remarkable energy and good humor. Except for his white hair he appeared to be

not over fifty years old. Certainly no one would have guessed that he had passed his seventy-sixth birthday. We are told that he would often "ride a fiery horse all day over rough country,—then dance all night like a boy, and the next day be as 'fresh as a daisy.'" He seemed now to be the chief in command of all the work.

De Lesseps



Count Ferdinand de Lesseps.

This man was none other than Count Ferdinand de Lesseps, and the work actually going on was the digging of a French canal across Panama.

The company was assembled to witness the formal opening of the great work. The Bishop was to give it his blessing, and a tremendous charge of dynamite was to be exploded, to show how easy was to be the task of cutting through the rock. An eye-witness has described the scene for us. "The blessing had been pronounced, the champagne, duly iced, was waiting to cool the swelter of that tropic sun, as soon as the explosion "went off." There the crowd stood, breathless, ears stopped, eyes blinking, half

MAP VI.—DE LESSEPS AND THE ISTHMUS OF SUEZ.

in terror lest this artificial earthquake might involve general destruction. But there was no explosion! It wouldn't go! Then a humorous sense of relief stole upon the crowd. With one accord everybody exclaimed "Good gracious!" and hurried away, lest after all the dynamite should see fit to explode."

So, after much merriment and feasting, the company broke up and departed. As we look back upon that day's doings, which marked the beginning of the French enterprise, there seems something unlucky about that charge of dynamite that refused to explode.

But who was Ferdinand de Lesseps? And how did the French come to be building a canal at Panama? De Lesseps was a Frenchman who had lived for many years in Egypt. There he was but a few miles from that other great isthmus of the world,—at Suez,—where a strip of low land, less than one hundred miles wide, connects the two continents of Asia and Africa. As Panama blocked the most important route of commerce in the New World, so did the Isthmus of Suez in the Old World.

De Lesseps and the Isthmus of Suez

For ages there had been a demand for a canal between the Red Sea and the Mediterranean, and many wise men had studied the problem. To be of any value the canal must be what is called a "ship canal," that is, large enough for ocean vessels. But a ship canal one hundred miles long! No such had ever been built. The difficulties seemed too great.

Though De Lesseps was not an engineer of much experience, he was very ambitious and anxious to connect his name with some great undertaking. He could see that the task of building a canal at Suez was really simple. It

SHIP PASSING THROUGH THE SUEZ CANAL.

would require much money and patience, but the digging would be mostly through sand. There was little rock, and there were almost no hills. De Lesseps determined that he would be the man to build that ship canal. It was a daring scheme, indeed, but he went to work at once.

In 1858 a company was formed. Men had confidence in

De Lesseps and money was secured. In 1859 work was begun and progressed steadily and successfully for the next ten years. Before the world fully realized it, Africa was no longer connected with Asia by land. The canal was completed. The waters of the Mediterranean could flow into the Red Sea and a new route was secured from Europe to Asia.

Suez Canal

The Suez Canal is ninety-nine miles long, thirty-one feet deep, one hundred and eighty feet wide at the bottom, and four hundred and twenty feet at the water's surface. Great electric lights were placed along the banks and ships can pass through it by night as well as by day. The time of transit is from fourteen to eighteen hours.

The cost was $100,000,000 or about $1,000,000 for each mile. But those who had dared to put their money into this rash enterprise were richly rewarded, for enormous profits were made. Nearly four thousand ships now pass through the canal each year, and the Company receives an income from tolls of about $25,000,000.

One of the two great isthmuses of the world was conquered. De Lesseps was now at the height of his fame. All Europe rang with his praises. No task seemed too difficult for this successful man.

It is not strange, then, that he looked longingly across the Atlantic toward that other great isthmus at Panama. Nor are we surprised to find him laying plans in 1877 to do

in the New World what he had done in the Old. It need be only a forty mile canal at Panama. To be sure, others had tried and failed, but was he not the very man to win? When he declared that "the Panama Canal will be more easily begun, finished, and maintained than the Suez Canal," rich and poor alike were eager to furnish money.

De Lesseps and Panama

So in 1879 the French Panama Canal Company was formed. The Atlantic and Pacific were to be directly connected by a canal twenty-eight feet deep. It was to be built at a cost of $214,000,000, and to be finished in eight years. A great force of workmen was secured, machinery purchased, and everything made ready. The Bishop blessed the work, as we have seen, and the canal was begun.

A whole book might be filled with the story of the French Canal. For us three words will explain what happened.

French Work at Panama

Disease.—It seems as if De Lesseps and his associates should have known enough about Panama to have reckoned with the old enemy,—Yellow Fever. They did build expensive hospitals,—one at Panama City cost nearly $6,000,000,—another at Colon, $1,400,000; but they were badly managed and the sick were poorly cared for. We have, no doubt, already seen the yellow fever ward of the hospital at Panama City. In this one ward twelve hundred patients died. Worse still, while they tried to cure the sick, the French did little to prevent sickness. The towns were

left as filthy as ever, the water supply remained poor, and the laborers continued to fall ill. Out of a total of 86,800 workmen, 52,000 were treated for sickness; the deaths during the twenty-three years of French work were at least 15,000.

Fever Ward—French Hospital, Panama City.

Waste.—The French had failed to make a careful study of the difficulties before they began the work. The Panama Canal was far harder to build than the Suez Canal. Money was poured out like water. But poor plans and poor engineers made the canal grow very slowly. Waste and extravagance were seen on all sides. Yet glowing stories of great progress were sent home to France. Newspapers were

bribed to make false reports. For several years the French people were deceived. The canal was soon to be completed, they were told, and they continued to furnish huge sums of money for the work.

Theft. — De Lesseps was not, perhaps, an intentionally dishonest man. But he was an old man and unfit to guide so tremendous a work. Many men who worked with him were dishonest and by them he was deceived. Not only in France but also in Panama large sums of money went into the pockets of those in power.

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FRENCH MACHINE WORKING ON A BANK IN PANAMA CANAL.

It is said that fully one third of all the money raised was practically stolen from the treasury. This spirit of corruption made its way down from the higher officials through all classes even to the lowest. Every form of vice flourished on the Isthmus.

Disease, waste, and theft went on for seven years. Of

course, much good digging was done, but at the end of that time not over two fifths of the whole work was completed. Nearly four hundred million dollars had been raised. A

De Lesseps Palace.

large part of it was secured from French farmers and day-laborers, who believed in the great De Lesseps and turned over to him their little savings. About one third of this enormous sum was wasted, one third stolen, and one third actually spent on the canal. What a dreadful story of mismanagement! Had all the $300,000,000 been properly spent, the canal might have been finished.

At last the whole world came to know what had hap-

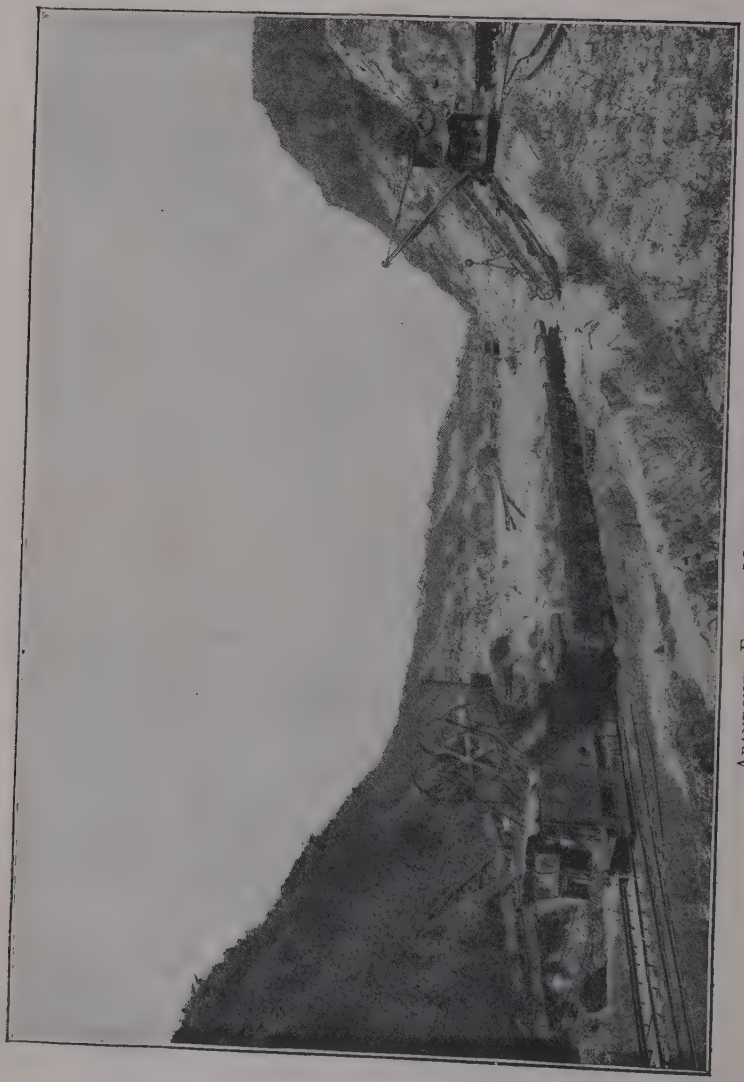
pened. It was clear that De Lesseps and the French Panama Canal Company had failed. Rage and excitement spread over France. Thousands of persons had sunk all their money in the great scheme, and now found themselves ruined. The end had come, no canal was built, the money was gone.

French Failure

Then a long trial was held to find out who was to blame. Many leading men in France were accused of sharing in the

PORTION OF CANAL COMPLETED BY THE FRENCH.

robbery. Several committed suicide rather than face the angry French people. During the trial a number of members of the Company were sentenced to pay heavy fines or



Abandoned French Machinery in Culebra Cut.

to spend years in prison. The aged De Lesseps, now broken in health and reputation, was unable to stand the strain. When he was sentenced to five years' imprisonment, he fell into an unconscious state, his mind gave way, and within a few months he died in a mad-house.

In our visit to Panama we shall go out to see the wreck of the French work. Had we stayed long at Colon, when we

French Dredges Sunk in Rio Grande.

first landed, we might have seen the expensive dwelling built for De Lesseps and his associates. It is known as the De Lesseps Palace, and shows how French money was needlessly wasted.

All along the route between Colon and Panama City were bits of the canal partially completed. For years, in the great ditches, the steam excavators stood silent, just as they were left when the French work stopped. In the rivers

"The Jungle Has Crept in Upon Them."

the dredges rotted at their wharves or sank to the bottom. Here, for instance, in the Rio Grande are two dredges with their tops just sticking out of the water. Each cost many thousands of dollars. They were soon worthless. Ten thousand cars, six thousand wagons, two hundred miles of track, with hundreds of locomotives, derricks, excavators, and dredges were left idle.

How sad a sight the long lines of locomotives present. Black and rusty, they are fast going to ruin within sight of the very spot on which De Lesseps and his friends so gaily opened work on the canal. The jungle has crept in upon them. Nature is trying to hide the pitiful signs of French failure.

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DE LESSEPS STATUE—SUEZ CANAL.

The world has long ago decided that De Lesseps himself was only partially responsible for the wreck at Panama He attempted more than he was able to do. We can well afford to forget his failure there and to remember him only as the man who planned and completed the canal at Suez, —the longest ship canal in the world. At the mouth of that canal his statue stands looking out over the waters of the Mediterranean. His right hand is outstretched, as if inviting the ships of the world to enter his great waterway.

CHAPTER XI

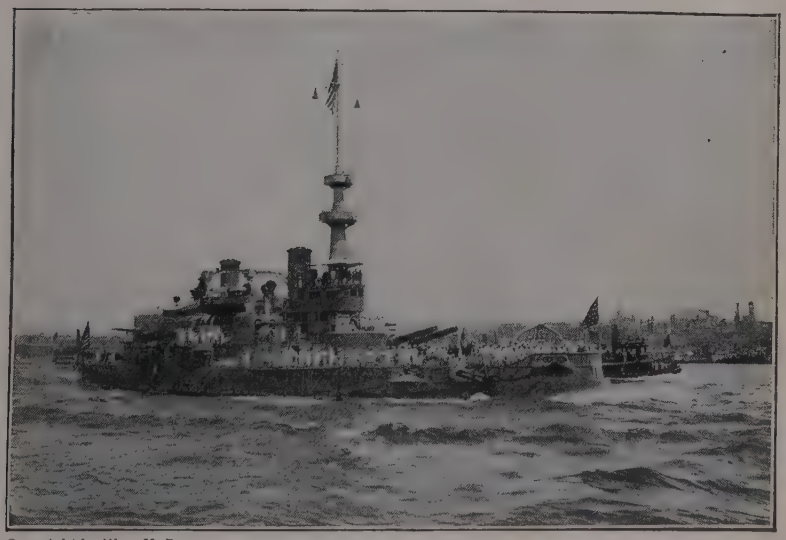
THE UNITED STATES AND PANAMA

The Oregon

The fine American battleship whose picture appears opposite holds a splendid record in our navy. When war was about to break out between the United States and Spain in 1898, this vessel was in the harbor of San Francisco, on the Pacific. As Spain's fleet was expected to attack our eastern coast, and the *Oregon* was one of the most powerful ships in the navy, she was needed in the Atlantic. Orders were sent to Captain Clark on March 19, to leave San Francisco at once for the long trip around the southern point of South America and north to join the Atlantic fleet in the West Indies. None of our ships had ever made so long a trip or one so full of perils. If she came through it safely, there was no certainty that she would still be in fighting trim. Thirteen thousand and four hundred miles and all at record speed! We all remember the pleasure and enthusiasm that spread over the country when the great ship joined the Atlantic fleet without the slightest damage to her machinery and with her guns and men ready to give battle to the Spaniards.

The trip had required more than two full months. Had there been a Panama canal, the journey would have been

but four thousand six hundred miles. It could have been done in fifteen days and no haste would have been necessary. Americans were more than ever roused to the value of a canal. This remarkable voyage had been an object lesson.



BATTLESHIP "OREGON."

But it was not alone the voyage of the *Oregon* that interested our people in a canal across Central America. If there were a canal, no nation of the world probably would use it more than we, both in times of war and in times of peace. For more than seventy-five years the United States has been interested in the canal. We read that away back in 1825 Henry Clay

American Interest in a Canal

declared it to be his firm belief that the United States should build it. From that time to this hundreds of other public men have expressed the same feeling. Both President Jackson and President Grant urged Congress to consider the matter. Many thorough surveys of the different routes have been made from time to time by American engineers.

But until recent years the rich men of America, and the American government itself, were busy developing our own great lands. Mines, oil wells, factories, railroads, battleships, and scores of other necessary things, cost immense sums of money. There was little time or money left for a doubtful enterprise in Central America. So we were obliged to look on, while other nations tried to build a canal and failed. No people were more interested than ourselves in De Lesseps's plans. When the French failed and England seemed unwilling to try again, it was clear that no canal would be built unless by Americans. And so it finally came about at the close of the Spanish war, that our government decided that a canal must be built and owned by the United States. As President Roosevelt said, "this is the greatest engineering work the world has yet seen, but the canal shall be built!"

Until 1903 American engineers favored the Nicaragua route (No. 4, Map V, p. 94). We cannot here mention all the reasons for this. Questions of climate and floods, of distance and ease of digging, of storms and earthquakes, had to be considered. The canal at Nicaragua would be one

hundred and twenty miles longer than the Panama canal. But one hundred and seventeen of this would be through the great Lake Nicaragua. Then, too, the San Juan river could be used in part; so that only about twenty-seven miles would actually have to be dug at Nicaragua. On the other hand the floods in the San Juan river were as severe as in the river Chagres at Panama, and the frequent storms on Lake Nicaragua presented a difficulty. It was also thought that earthquakes are much more severe in Nicaragua than in Panama, and might damage the canal or even destroy it. At Panama were two good harbors, a railroad from ocean to ocean, a canal already partially completed, and an immense quantity of machinery of all sorts.

The Two Routes

In fact, much could be said in favor of each route, and much was said, not only in Congress but also in our newspapers, and in private discussions all over the country. Finally, however, President Roosevelt and Congress decided that if the French Panama Canal Company would sell all they had left at Panama for a reasonable price, and if we could buy a strip of land across Panama, the canal should be built at that point.

The French Company wanted $90,000,000 for its property but at last agreed to accept $40,000,000. The Republic of Panama in February, 1904, sold to the United States for the sum of $10,000,000 a strip of land ten miles wide and fifty miles long extending across the Isthmus from the At-

lantic to the Pacific. This strip is now known as the Canal Zone, and it is controlled absolutely by the United States provided we build and operate a canal.

Although an outlay of $50,000,000 was necessary before a shovelful of dirt was moved, the United States was now ready to build a canal at Panama.

The Canal Zone

On May 4, 1904, President Roosevelt, in behalf of the American Government and people, took possession of the Canal Zone and all it contained, except the cities of Colon and Panama. These are in the Zone but are still a part of the Republic of Panama. The area of the Canal Zone is about five hundred square miles or about one quarter the size of the little state of Delaware. As we shall see, the canal route is directly through it from end to end. An Isthmian Canal Commission was appointed and the Hon. William H. Taft, then Secretary of War, was directed to supervise the work. Major-General George W. Davis was made Governor of the Canal Zone.

A new and interesting piece of land was thus added to the territory of the United States (Map VII). It is, as we have said, 50 miles long and 10 miles wide. The American port of the city of Colon is called Cristobal, of the city of Panama, Ancon. Between these two ends of the Zone the principal towns were Gatun, Gorgona, Bas Obispo, Empire, Culebra, and Pedro Miguel. While the United States was building the canal there were twenty-five small towns and a number of camps for workmen.

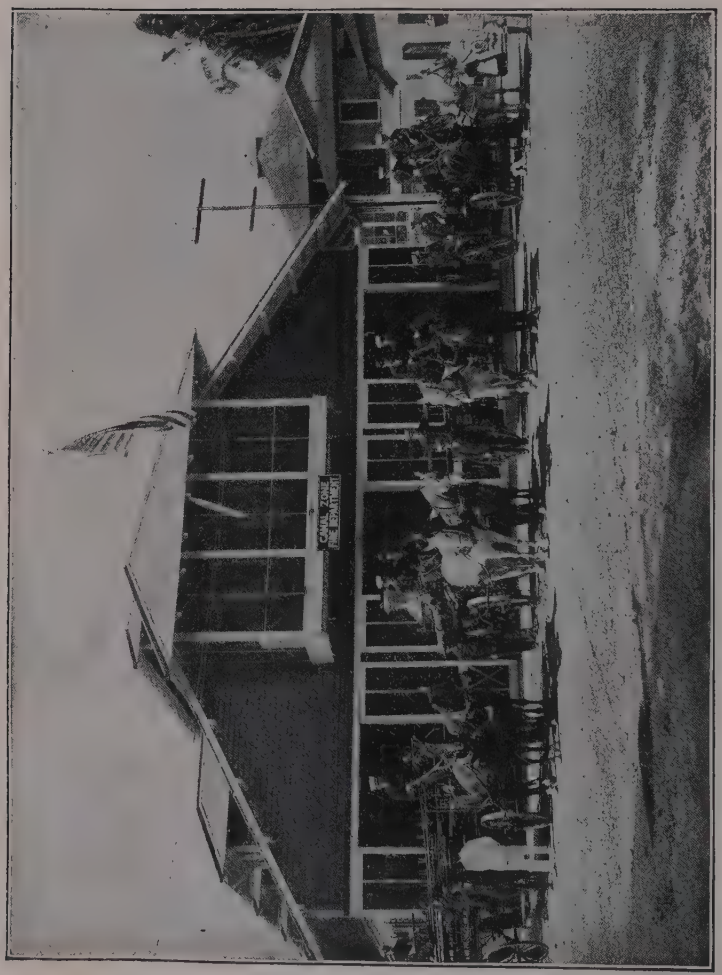
It was no small task to establish a good government for all these towns and people. There must be courts, prisons and police, a fire department, post offices, schools, and all those things that would add to the safety and welfare of those who were to dig the canal.

Government Established

Colombian money, for instance, was still (1903) in use on the Isthmus. The standard was the peso (pa'so). In name,

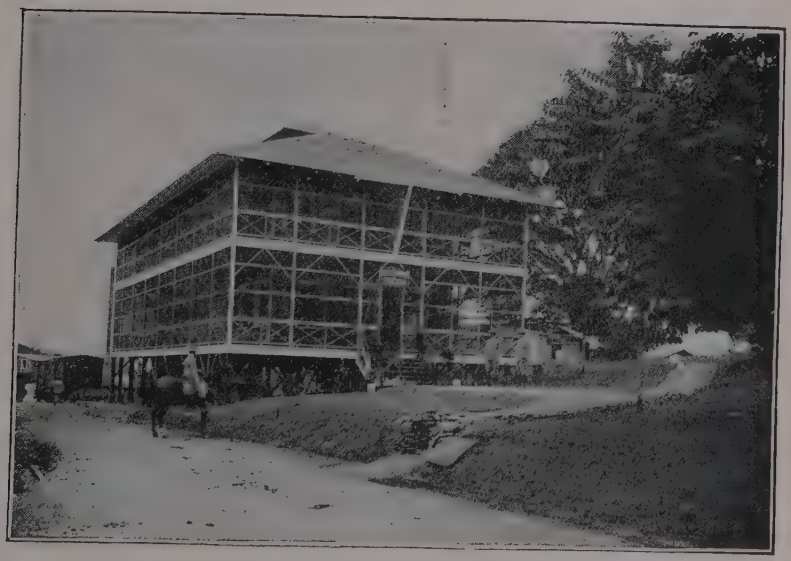
MAP VII.—THE CANAL ZONE.

at least, it was the same as our American dollar. But its value was less than one cent. Imagine taking a Colombian $5 bill to a bank and getting in exchange for it an American nickel. An amusing story is told by a gentleman from New York, who invited the United States consul to a dinner at a hotel in the City of Panama. When the meal was over he found that it had cost him $1,400 in Co-



"First-class Fire Station—Cristobal."

lombian money, and was not much of a dinner at that. Our gold dollar is now the standard money in the Canal Zone, though coins of the Republic of Panama are also used. The Balboa is the standard Panama coin. It is of silver, about the size of our own silver dollar, and worth fifty cents.



Police Station—Ancon.

When writing letters home from Panama we may now use the American post offices of the Canal Zone, but the letters will carry the Panama stamps, with the words Canal Zone printed across the face.

Before the Americans came to Panama fires were very

common in the towns, especially in Colon and Panama City. There were no regular fire departments, and the volunteer fire companies were of little value. The firemen could not afford to leave their regular employment and when the fire bells rang they were, of course, scattered about in various parts of the town. Nor did they at once run to the scene of the fire, but seemed more interested in first exchanging their working clothes for the gay, red suits of which they were very proud. Meanwhile the fire had done much damage.

In Cristobal we perhaps saw one of the first-class fire stations established in the Zone by the Canal Commission. It is in every way as good as we have at home. Safety from bad fires is now assured.

CHAPTER XII

CONQUEST OF DISEASE

After the United States took possession of the Canal Zone, as we have just described, the American people expected to see the canal begun at once. "Make the dirt fly," demanded our newspapers. There was much impatience and disappointment that for two full years little digging could be done. Yet plain American common sense tells us that an immense amount of preparatory work was necessary. The more we know of it, the more we shall admire the patient, careful way in which the Commission made ready for the great work.

The lessons of past efforts at Panama were not forgotten. First of all, disease must be conquered. No canal work could hope to succeed until this was done. In the second place, a large force of workmen must be assembled and houses and food provided for them. Then, in the third place, plans and surveys must be most carefully made and a vast amount of powerful machinery secured. And while all these preparations were going on, waste and theft must be absolutely prevented. Our government expected to pay its workmen generously and to provide in every way for their comfort, but beyond that every dollar of American

money must go toward building the canal. When all these things had been accomplished, the dirt might really "begin to fly."

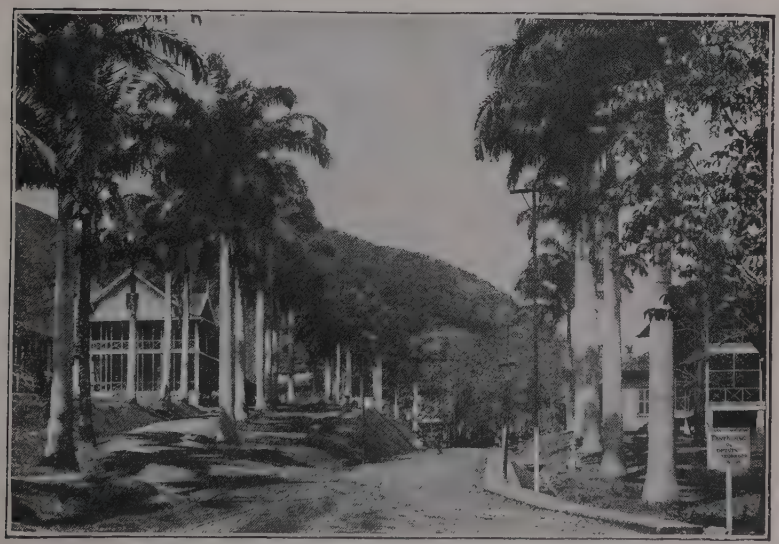
One morning in the City of Panama, not long before the United States took possession of the Canal Zone, Dr. Amador met the American consul. Amador was at that time Chief Health Officer of the City of Panama. Some-

ENTRANCE TO HOSPITAL GROUNDS—ANCON.

thing serious was evidently troubling him, for his face showed great anxiety.

"Consul," said he, as the two men shook hands, "we have six cases of yellow fever in the city."

At this bad news the consul was equally troubled and the two men discussed what could be done to stop the spread



View of Hospital Grounds from Entrance—Ancon.

of the disease. Like most Panamanians, Dr. Amador seemed to feel helpless in the presence of this old enemy.

By chance the same men met upon the following morning.

"Well, consul," said Amador, now smiling and happy, "it gives me pleasure to report that we now have no cases of yellow fever in Panama."

"How is that?" said the consul.

"They are all dead," replied the doctor.

This story is often told to illustrate the way in which

the people of Panama had come to look upon the tropical diseases so common upon the Isthmus. Here, as in many other parts of the tropics, the people felt that nothing could be done to prevent the dreadful loss of life. They were either ignorant of the causes of the diseases or if they did know, they were too lazy to remove them. The whole history of Panama, even from the days of Columbus, was one long record of human lives cut off by malaria, bubonic plague, and yellow fever. It is true that the natives were accustomed to the climate and did not suffer so severely as those who came to Panama from other lands, but the death rate was always high. The number of deaths among the French laborers shocked the whole world. Everywhere Panama had an evil reputation for unhealthfulness.

As we walk about during our stay in Panama City, we find many parts of the town that are still neither clean nor healthful. But, as a whole, the place is today as clean as many of the better cities in our own country.

Old Conditions

It is now almost impossible to believe that Colon and Panama City were once about as dirty cities as could be found in the world. But let us look at some pictures in order to see what the old conditions were. Here is a street in Panama as it looked a few years ago. Imagine attempting to cross it. Would you care to live on such a street? Do you see any signs of sewers or hydrants? Probably not, for there were none. Not a good sewer nor drain nor water pipe in a

North Avenue, Panama—"As It Looked a Few Years Ago."

city of 30,000 people! Not every street was as bad as this, but there were many of them, and some much worse. If you think the street itself is filthy, suppose we pick our way around behind the houses. We should not care to stay there long,—just long enough to see that all the refuse from them found its way into the back yards. From there the waste water slowly ran out into the street. So much rainfall kept the whole mass soaking wet. The hot sun beating down on clear days could not dry out such places. Foul odors and disease must have been common. President Taft said of the streets of Panama City: "They were muddy in rainy weather, dusty in dry weather, and full of disease in all weathers."

But what were those curious looking barrels and tanks behind the houses? Take a careful look into one of them. Do you see those odd "wigglers" on the surface? They are little wormlike bodies and out of each a mosquito will soon hatch and fly away. Among these mosquitoes are, no doubt, some of that much dreaded sort that carry the yellow fever. And this dirty barrel certainly cannot contain drinking water,—and yet it does, for there is no other to be had in Panama City! Perhaps these barrels and tanks that catch the rain water on which the city depends, may explain why so many of the poor of Panama seem never to have taken a bath.

A picture of a Colon street shows even worse conditions. Colon was built upon ground so low that there simply could

North Avenue, Panama—After Paving.

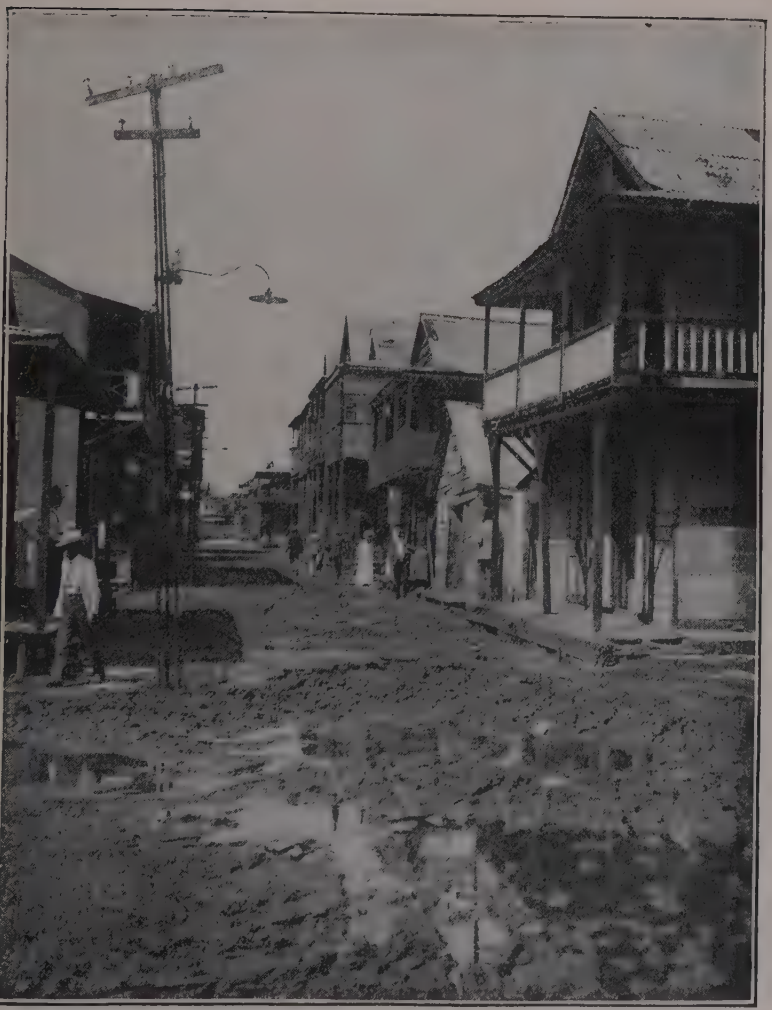
be no drainage. The houses of the well-to-do were kept fairly clean, but of the houses of the poor, the less said the better. And all about Colon were the swamps and jungles, poisonous air, and more mosquitoes.

If the two best cities of Panama were as unhealthful as this, what must have been the condition of the twenty or more miserable little towns along the line of the canal?

It was clear to the Canal Commission at the very beginning that no canal could be built as long as filth and disease continued. So they advised that a man be appointed to clean up the Canal Zone and the cities of Colon and Panama. He must be a man who knew about tropical diseases and had had experience in fighting them. He must have unlimited courage and patience. And he must be given all the money, men, and time necessary.

Colonel Gorgas

The man chosen for this important task was Colonel William C. Gorgas of the Medical Corps of the United States Army. Experience has shown that the choice was a good one. Colonel Gorgas had stamped out yellow fever in eight months in Havana, Cuba, where it had been epidemic for more than one hundred and forty years. But the task at Panama was much more difficult and would surely have discouraged a less determined man. When Colonel Gorgas completed his first inspection of the Canal Zone and declared that he would make it a fit place for white people to live in,—practically the whole of Europe laughed. Let us see how near he came to making good his promise.



STREET IN COLON BEFORE PAVING.

At Colon and at Panama City the French Canal Company had built expensive hospitals. Both were large and finely situated, especially the one at Ancon, the suburb of

Bolivar Street, Colon—After Americans had Cleaned and Paved It.

the City of Panama. Colonel Gorgas enlarged and improved these hospitals and put them in charge of a corps of expert doctors and trained nurses. We can see for ourselves that they are as well equipped to care for the sick as are any in our own country. Smaller hospitals and camps for the sick were built also at convenient points along the canal line.

Another thing that had to be done at the very outset was

to clear away the filth in the cities and towns,—the untouched accumulation of years. In the early reports of Colonel Gorgas we can read of tens of thousands of loads of rubbish and filth carted away each month.

But to give to the cities of Colon and Panama a thorough scrubbing and afterwards to keep them clean, required that the streets be paved, that there be good sewage systems

COLONEL W. C. GORGAS, MEDICAL CORPS, U.S.A., CHIEF SANITARY OFFICER, PANAMA CANAL ZONE.

built, and a plentiful supply of good water. These three things required many months of labor by several thousand men. But we can see now that the work has been well

done. Everywhere are well-paved, dry streets and plenty of drains and sewers. Out in the hills behind Colon and Panama City excellent reservoirs were built. If we chose

Street in Colon—Before Paving.

to do so, we could go to see for ourselves that the water is abundant, pure, and good. It is piped into the cities and towns in such large quantities as to give to each inhabitant at least fifty gallons each day. Certainly that quantity should be sufficient to keep one person clean.

The result is that Panama City is now the best paved, best sewered, and best watered city in all Central America or the northern half of South America.

But this work met much opposition among the Panamanians. Too many were satisfied with the old conditions. They did not want to be clean. They saw no reason for disturbing their houses either inside or out. They opposed the use of clean water. Colonel Gorgas, therefore, selected a number of men, mostly intelligent natives, and sent them about day by day among the poorer classes to teach the value of keeping their houses, their streets, and themselves clean. Slowly these health inspectors succeeded. And we now find all classes assisting in the work of getting clean and keeping clean. As for the water, it is now used freely by all. It is a common and an amusing sight to watch

A Clean Zone

STREET IN COLON—PAVED AND CLEANED.

the negro children enjoying the cool water from the hydrants.

The three diseases that are most deadly to those who

MOUNT HOPE RESERVOIR.—"THE WATER IS ABUNDANT, PURE, AND GOOD."

come to Panama from other parts of the world, are plague, malaria, and yellow fever. The first is usually brought in by rats with fleas or other parasites in ships from infected ports. The diseased rats on these ships carry it to other rats about the wharves, and thus the germs are carried into the houses and plague breaks out among the people. If plague were to go, the rats must go first. All incoming ships are thoroughly inspected

Three Deadly Diseases

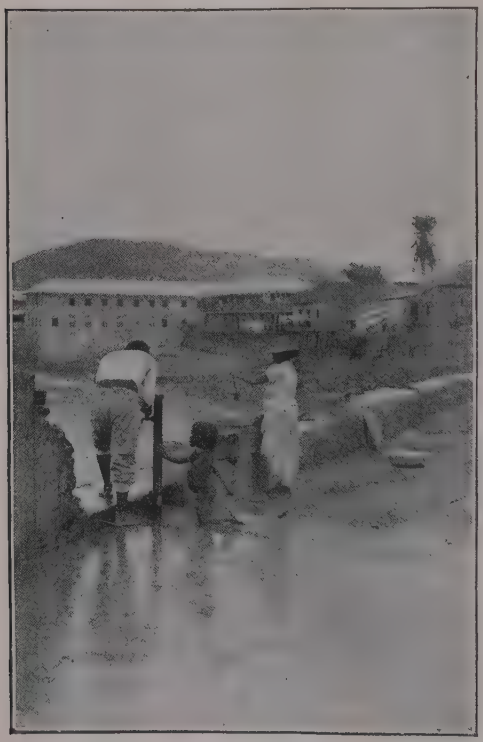
and the rats are killed. Tons of rat poison were placed each week where the animals could easily reach it. A considerable number of men were organized into a "Rat Brigade." Their only business was to destroy as many as possible. So thorough has been their work that the rats are practically exterminated and the Canal Zone is now free from the danger of plague.

The same thorough measures were taken to prevent

OPENING OF PANAMA WATERWORKS SYSTEM, JULY 4, 1905.—IN FRONT OF CATHEDRAL.

malaria and yellow fever. Both are diseases common in a tropical climate like Panama's. The danger lies in the fact that mosquitoes that sting patients who are sick with

either disease carry off the poison to those who are well. From one patient many may thus be made sick. Not all die who have the malaria but few recover from the dreaded yellow fever.



Begging for a Bath.

The mosquito that carries the fever is called the Stegomyia. Having bitten a person who has the fever, the Stegomyia may carry the poison in its stinger for several months. Anopheles is the name of the variety that carries the malarial poison. Though it carries it for only a few days, it can fly faster and farther than the Stegomyia, and often bites by day as well as by night.

To conquer malaria and yellow fever the mosquitoes had to be destroyed throughout the Canal Zone and in Colon

and Panama City. This seemed like an impossible task, but Colonel Gorgas and his men went bravely at it. An "Anopheles Brigade" and a "Stegomyia Brigade" were formed. The people laugh in Panama today and say that all of Colonel Gorgas's men could be seen at times running after one poor little mosquito. At any rate it was no joke for the mosquitoes. They were attacked everywhere. Kerosene and "mosquito oil" were poured over stagnant pools, rain barrels were screened, miles of ditches were dug and swamps drained, great areas of jungle were cut down and burned, and all sorts of methods were used to destroy the breeding places. Then the homes were frequently fumigated and most carefully screened, and cases of fever were separated from those who were well. Indeed, it would be impossible to tell here all the various methods that were

Mosquito Brigades

THE BATH.

taken to free the Zone of these deadly little pests. And not only was it necessary to kill those already there, but others had to be prevented from coming in. Constant watchfulness by several thousand men was necessary.

We must remember, too, that all this work had to be done at the same time that thousands of ignorant laborers were flocking to Panama to work on the canal. It was difficult to get these men to take even the simplest ways of protecting themselves.

Home Again and Happy.

How anxiously Colonel Gorgas must have watched the daily and monthly health reports! As the filth and mosquitoes departed, would King Disease go too? Slowly, month by month, the death rate came down. Fewer and fewer cases of yellow fever were reported. At last none could be found. That was in May, 1906. Scarcely a case occurred again while the canal was being built. With the fever went also much malaria. Cases of the latter became very mild, often scarcely more serious than a severe cold in a northern climate.

The great fight was expensive. Before the canal was finished the United States had spent for health purposes on the Isthmus a total sum of $20,000,000. But no one now doubts that it was money well spent. As Americans we can today feel proud that we have at last made it possible for a laborer to work

Healthful Panama

Avenue of Palms at Cristobal.

in the Canal Zone with as much safety as in most parts of the United States. There is at present no higher death rate in the Canal Zone than in New York City. When King Disease was thus conquered, the battle for the canal was half won.

CHAPTER XIII

ASSEMBLING A WORKING FORCE

To make the Canal Zone a fit place to work in was a difficult task. To secure a sufficient number of good workmen was another almost equally difficult. The American laborer is the most efficient workman in the world. If enough of such laborers could have been persuaded to go to Panama and to stay there and work, the labor problem would have been easily solved and the canal built in the shortest time. But this was soon found to be impossible. Though the wages offered were high, large numbers of laborers did not care to leave their homes in the United States and go away off to Panama. There were plenty of good opportunities for work nearer at hand. The Canal Commission was, therefore, obliged to secure the best laborers it could get in lands whose climate was similar to that of Panama.

In the busiest years there were nearly 40,000 men at work on the Canal and the Panama Railroad. The latter was now owned by the United States and run by the Canal Commission. Of the 40,000 men about 5,000 were the skilled workmen and were mostly Americans. These 5,000 were trained engineers, draftsmen, clerks,

The "Gold Men"

steam-shovel men, powder men, surveyors, foremen, etc. Many people believe that no finer force of men than these Americans was ever gathered together for a great work.

They were, indeed, a splendid lot. Without their brains and energy no canal could have been built. Therefore, they were well paid and well cared for. The pay received was about one and one half times as much as for similar work

DINNER TIME AT A COMMISSION HOTEL.

at home. Their wages were paid them in gold and they were, therefore, known in Panama as the "Gold Men."

The contrast between these American workers and the natives of Panama was very striking. "You see the Pana-

manians idling out of windows and in the shade of doorways watching our driving work. They are thin, slow-moving, impassive, often solemn. There is no glow in the dead yellows and browns of their flesh. But when you look at

A PRIVATE MESS AT CRISTOBAL.

our engineers, mechanics, and foremen, you see full-blooded health shining in their faces. They are boisterous, hard-working, ingenious, quick to lay hold of a pick or drive a spade, to show how it should be done. Their good humor is almost unfailing, but it never enfeebles the sharp word of command, as the dull Jamaicans have learned."

Because the "Gold Men" did not fear disease in the Canal

SIDE STREET, CRISTOBAL—SHOWING DWELLINGS OF GOLD MEN.

"COMFORTABLE, DRY, WELL-BUILT HOUSES."

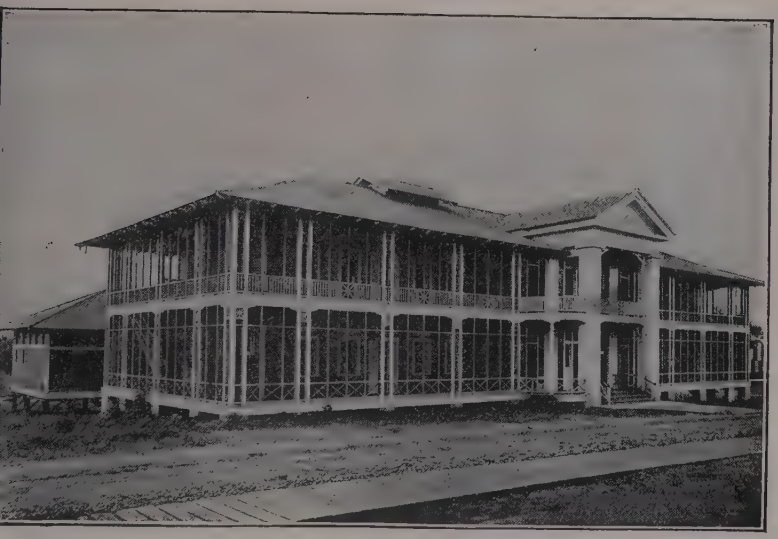
Zone, many of their families went down to live with them. In towns like Cristobal, Ancon, and others we can see their comfortable, dry, well-built houses. Their children attended good American schools in the Zone and were as bright and happy children as could be found.

In recreation hours these "Gold Men" were a jolly company. They thoroughly enjoyed their baseball, basket ball, tennis, and other sports, or reading and loafing in the club houses provided by the Canal Commission. There were many of these club houses along the line of the canal work. They were conducted by the Young Men's Christian Association. There were libraries and women's clubs too; and fishing parties and picnics and other pleasures made life agreeable for both men and women.

The "Silver Men"

The 35,000 common laborers were paid in the silver money of Panama or its equivalent, and were known as "Silver Men." The usual wage amounted, on the average, to about $1 per day in our money or about $2 in Panamanian money.

We remember that when the Panama Railroad was built, it was found very difficult to secure laborers who could endure the climate of Panama and do any real work. The De Lesseps Company had the same difficulty. The French found that the negroes from the islands of the West Indies, especially Jamaica, were the best all-round workmen that could be had in large numbers. This, too, has been the experience of the United States.



COMMISSION CLUBHOUSE AT EMPIRE.

BOWLING.

At Panama these negroes received higher wages than they had ever known before and were provided with hospital treatment when sick and with clean dwellings and good food. Their houses and camps could be seen all along the line. Those of us who know what wretchedly dirty huts they are accustomed to, will understand better why they were glad to stay and work on the canal. A prominent American of long experience with these men said,—"These West Indian laborers have never known, and in their most pleasant dreams have never hoped for, the splendid care and liberal treatment they are receiving from our government on the Isthmus of Panama."

At the mess-kitchens for the negroes the Commission furnished them three good meals per day for about thirty cents. It is said that at first they objected to the strengthening American food because it made them feel too much like working. "It consisted of rice, beans, onions, fresh and salt beef, codfish, lard, bread, sugar, and coffee, varied with occasional potatoes and bananas."

Despite good care and good food these negroes were not good workmen. Some were expert loafers. Many studied to do just as little as possible. Nearly all were dull, stupid, and ignorant. Their movements were slow and their efforts lacked energy and intelligence. Moreover, they objected to working in the rain and ran for shelter when the first drops fell. Theodore P. Shonts, at one time Chairman of the Canal Commission, relates the following story to show how

"Clean Dwellings."—Common Laborers' Quarters, Colon.

"Three Good Meals per Day for Thirty Cents."

they worked. A heavy piece of machinery was being unloaded from the hold of a vessel. The tackle got caught in the rigging on the deck above; the foreman in charge of the gang of laborers sent one of them above to free the tackle. The laborer went to the place to which he was sent and did what he was told to do. The foreman, paying no attention to him after he started on his errand, missed him a few minutes later, and, looking around for him, discovered him sitting peacefully at the spot to which he

"Curious Turbans and Foreign Faces."

had been sent. "What are you doing there?" yelled the foreman. "You told me to come here, Sah." "Well, why didn't you come back?" "You didn't tell me to,

Sah." Altogether these men probably did not accomplish more than one half as much as such laborers in a cooler climate.

Better than the negroes in the value of their work were some East Indians. There were not many of them on the canal. They had come chiefly from Asia to the British West Indies and thence to Panama. What odd-looking fellows they were! The curious turbans on their heads and

A Group of Spanish Laborers.

their foreign faces made them seem quite out of place on an American canal. They were much larger and more energetic than the negroes and, though slow in their move-

ments, worked quietly and steadily. The Commission was very glad indeed to get them, for they were thoroughly good workers, peaceful, sober, and industrious. They could usually be seen carrying the 50-lb. boxes of dynamite from the powder houses to the other workmen. They were proud of their race, remained closely by themselves, and even in Panama kept many of their native customs.

Of all the " Silver Men," the Spaniards and Italians were the best. They did twice as much work per day as did the negroes, and they received much more pay. There were about 8,000 of them at work in the Zone. Nearly all came directly to Panama from Spain or Italy. The Spaniards were perhaps less likely to suffer from the climate and, therefore, accomplished more. They were small in size but muscular, willing to be taught, and anxious to be promoted to better positions as subforemen or foremen of

A Gang of Italians.

their work. Where strength and intelligence were needed, these men could be depended upon. No amount of rainy weather kept them from the work.

There were laborers of many other nationalities here and there on the canal work, but they were few in number.

INTERIOR OF A MESS HALL FOR EUROPEAN LABORERS.

Taking the "Silver Men" as a whole, we can see that they were of many races and languages, poor workmen, and hard to handle. And yet, under the leadership of the "Gold Men," they could and did build the canal.

One more thing remains to be considered in respect to the working force. It is the problem of feeding them and

of providing them with clothing and other necessities. Over 40,000 persons to be fed and the markets 2,000 miles away!

Supplies

Certainly that was no small matter. But here, too, the same careful plans were laid as for other parts of the work and the same satisfactory results followed. At Cristobal and at twelve other villages stores were built, in which food and all other neces-

Typical Labor Train.

sities could be purchased at prices only slightly above cost. An ice plant was erected at Colon and with it a cold storage plant, so that meat and vegetables and other perishable food could be kept in as good condition as in any part

of the United States in summer time. Early each morning a special train with cold storage cars was rushed out over the railroad to carry supplies to all points on the canal line. So it came about that quite as good food was served in the hotels and mess-kitchens as is provided for men in similar work in the United States.

CHAPTER XIV

MACHINERY AND THE PANAMA RAILROAD

It is an old saying that a poor workman puts the blame for his poor work upon his tools. It is equally true that a good workman cannot work well with poor tools. The United States government determined that whatever the quality of the laborers at Panama might be, the tools and machinery should be the very best.

We have spoken of the American laborer as the best in the world. He does the most and in the shortest time. This may be so in part because he has better machinery with which to work. American inventors and machinery lead the world. All over our broad land, on the farms and in the factories, in the mills and quarries, on the railroads, and hidden in the unseen parts of great buildings, ships, and mines, is a vast amount of wonderful machinery. It does easily, cheaply, and swiftly, work that no number of human hands could do.

Perhaps the most interesting to watch are those great machines that accomplish the heavy tasks of cutting, lifting, or carrying. There were many of this sort at work on the canal. Indeed, it would be safe to say that without the splendid American machinery that our government was

able to secure, no canal could have been built at Panama. Human hands alone could never have done the work.

When our government purchased the property of the French Canal Company, it came into possession of an immense amount of machinery of all sorts, scattered along the line of the canal. That was in 1904. Much of the French machinery had been at work as far back as 1889, and so, of course, was out-of-date. Much also had been ruined by rust and neglect. Some, however, could be used. For instance, it was found that more than one hundred and twenty-five of the old French locomotives could be repaired and put to work again. Some old dredges, scows, tugs, dump cars, etc., with many miles of track, were still ready for service. What work the Canal Commission accomplished during the first two years of preparation was in large part done with this old machinery. Some of it was in use until the canal was completed. It has been said that the old French machinery was worth fully $2,000,000 to the United States.

Old French Machinery

In general, however, an entirely new outfit of tools and machinery was necessary. Here again the distance of Panama from supplies of this sort added tremendously to the difficulties. Locomotives and dump cars, dredges and steam shovels, barges and rock crushers, and a vast amount of hand tools were purchased and shipped to the Isthmus. In the Zone itself docks for handling machinery, coal, lumber, etc., were built. Long

New Outfit

lines of track were laid to carry the machinery and supplies to the scene of work. The largest cement-mixing and handling plants ever built were here constructed. Compressed-air plants to furnish power for the drills, and great

"One of the Two Greatest Repair Shops."

general repair shops were erected. The splendid equipment for work which the Commission was able to secure astonished those who later traveled along the line of the canal.

At Empire, for instance, was one of the two greatest repair shops. It was close to the line of the canal. Notice how the railroad tracks were arranged so that even the largest pieces of machinery could be brought directly to the shop. In this

one place nearly 1,000 men were at work. The shops were modern in every way and equal to the best railroad repair shops in the United States. Here was a foundry and a lumber mill and everything necessary to repair or rebuild any piece of machinery on the canal.

Near the repair shops was the great storehouse. Here were great rooms with shelves on shelves containing over 10,000 different articles used in the canal work, and all

Storehouse at Empire.

neatly labeled and laid away. It was a common sight in this great storehouse to see some workman rush in with a note from some engineer or foreman out on the canal. A steam shovel had broken down or a drill was out of order

and a new part was needed at once. Immediately the men in charge of the storehouse could pick out the exact article, and before one knew what had happened, the workman was

TEN THOUSAND ARTICLES—"NEATLY LABELED AND LAID AWAY."

out again on the canal and the broken machine was soon repaired. This was the American way,—no confusion, no lack of materials, no delay. Time was as valuable at Panama as in New York.

Empire

Around the shops and storehouse at Empire there grew up the largest town in the Canal Zone, exclusive of Colon and Panama City. It was a pleasure to see how clean and neat the whole place was. It was more

like a park than a town. The ground had been cleared of jungle for a long distance away from the houses. Here, as in all the canal towns, the Commission had done everything to make living comfortable and healthful.

When the United States purchased the French Company's machinery, it also secured the Panama Railroad. Like almost everything else left by the French it was in need of repair. Its docks, yards, warehouses, tracks, loco-

"Powerful Locomotives were Also Added."

motives, and cars were not fit for the great increase in business which at once came to the Isthmus. The road had been in the habit of doing everything in the most expensive

way. The unloading of coal from steamers is a good example. It was done almost entirely by the hands of negro laborers and cost $1.30 a ton. The Commission put in a modern coal-hoisting machine and did the work better

"Soon the Road was in First-class Condition."
Private car of Chairman of Isthmian Canal Commission.

and quicker for 12 cents per ton. In the same manner the road was improved by heavier rails, by double track for nearly all of its length, by new and better wharves, and by larger yards and cars. Eighty-two powerful locomotives were also added. Soon the road was in first-class condition.

But all this work required many months of labor and much money. Real digging was still delayed.

CHAPTER XV

SEA-LEVEL AND LOCK CANALS

The two years filled with the slow and costly work of preparation which we have been describing, seemed very long indeed to those who wished to see the "dirt fly." We can now understand clearly why so much delay was necessary. The canal could not be built without it. And when the work of digging once began it could go faster and more successfully.

During these two years also a careful study was made of the land between Colon and Panama City, in order to see what sort of ship canal was best for the Isthmus at that point. Ship canals are not all alike. There are two kinds or types, as they are called, that we must understand before we can know what was done at Panama.

Sea-Level Type

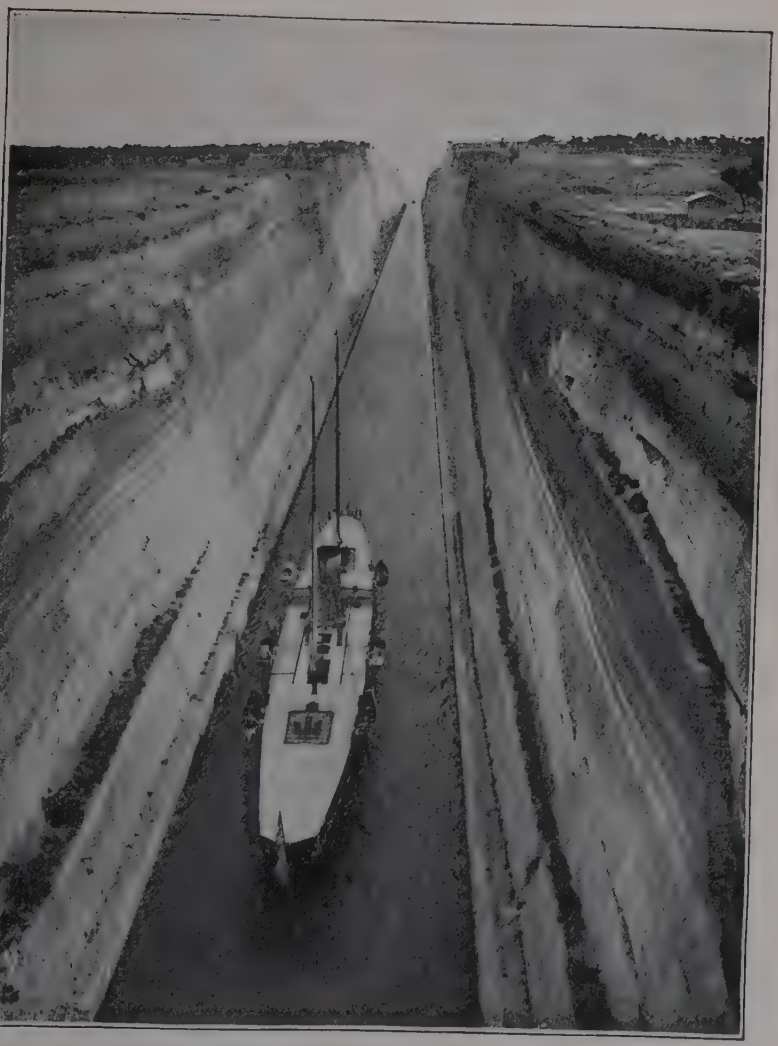
The first is the sea-level type. This type is easy to understand. A sea-level ship canal means merely a great open ditch dug at the same level between two bodies of water. The water flows freely through it from one end to the other. It is dug as deep and as wide as is desired. The canal is thus what the geographies would call a very narrow "strait."

Ships can pass back and forth through it from ocean to ocean without difficulty or delay.

Of the nine ship canals of the world three are sea-level canals. They are the Cronstadt, the Corinth, and the Suez canals. With the latter we are already acquainted. The Cronstadt is in Russia. It is 20 feet deep, about 300 feet wide, and is about 16 miles long. The cost was $10,000,000. The canal was opened in 1890. The Corinth canal is in Greece and connects the Gulfs of Corinth and Ægina. The length is but 4 miles. The work was begun in 1884 and completed in 1893. The cost was $5,000,000. A picture of this canal, with Mr. J. P. Morgan's yacht *Corsair* passing through it, gives a very good idea of a sea-level ship canal.

This picture also shows several interesting things about the Corinth Canal. As can be seen, it is perfectly straight. This is true for its entire length. The depth of water in the canal is 26 feet, but the width at the bottom is only 69 feet and at the water's surface only 80 feet. Imagine a great ocean liner like the *Lusitania*,—88 feet in width, attempting to squeeze through. It would be impossible. Two very much smaller vessels could not pass each other. It is clear that in its present condition it is not useful for the large ships that carry the commerce of the world.

No other ship canal has so high or so steep banks. This is possible only because it was cut down through granite and hard clay, and because the rainfall during



THE "CORSAIR" PASSING THROUGH THE CORINTH CANAL.

the year at Corinth is not great, and no rivers flow into the canal.

But this sea-level type of canal is not possible where the two bodies of water to be connected are not on the same level or where the land between them is too high to be cut through. In such cases a lock canal is necessary. This is the second type.

Lock Type

To understand exactly what a lock canal is, let us take an illustration from our own country. The St. Marys Falls Canal connects Lake Superior and Lake Huron at Sault Ste. Marie, Michigan. Some of us have seen this little canal and perhaps have passed through it. It is but $1\frac{1}{3}$ miles long, and is 160 feet wide and 25 feet deep. The important thing to notice concerning it is the fact that Lake Superior is about 20 feet higher than Lake Huron.

If a ship on Lake Huron sails into the lower end of the canal and wishes to pass on to Lake Superior, it must be lifted 20 feet at some place in the canal. If, on the other hand, a vessel wishes to pass in the opposite direction, it must be lowered 20 feet. This raising and lowering is done in a portion of the canal known as a lock.

How does a lock work? Some pictures and a drawing may help to show. In the drawing the lock is seen to be a portion of the canal enclosed by strong walls and by two double gates A and B, one at each end. The walls are usually of masonry or concrete. Power is supplied by machinery, so that the gates can be

A Lock

opened or closed at will. Below gate A the water is at the lower level and a vessel is ready to sail into the lock. The water in the lock is at the lower level. Suppose that the gates at A are then opened. The vessel passes through into the lock and the gates are tightly closed after her. We

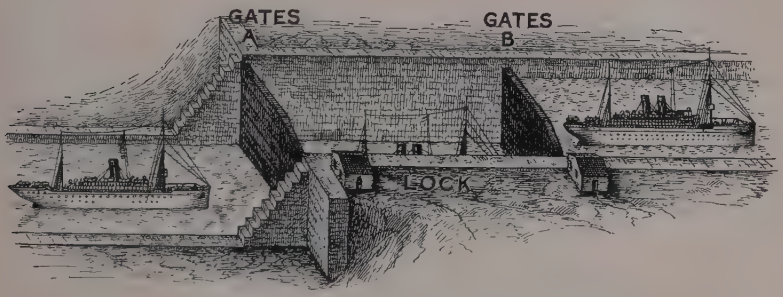


Diagram Showing Operation of a Canal Lock.

can now see her in the second position, ready to be raised. The inside of the lock is connected with the outer water levels by large pipes. When the flood gates in these pipes are opened the water from the higher level rushes in and rapidly fills the lock. The vessel meantime has been lifted by the in-rushing water until she floats in the lock on a level with the upper part of the canal. Then the gates at B are thrown wide open and the vessel sails away through the remainder of the canal.

The same thing can be done for a ship that wishes to go in the opposite direction. The gates at B are opened when the lock is full of water. The vessel passes in and

"The Process Actually Going On."

the gates are tightly closed after her. Next the flood gates are opened, the water in the lock runs out until it is down to the lower level, the gates at A are then opened wide and the ship continues on her journey.

An Empty Lock—Sault Ste. Marie Canal.

Now, if we look at the picture of the great locks in the St. Marys Falls Canal, we can see the process actually going on. In this canal there are two locks side by side with a power house between them to furnish the power needed to operate the gates. In the distance, on the left of the picture, the upper level of the canal can be seen. Nearer to us is a vessel

Locks in Operation

in the lock. We can see that the flood gates are being opened, for the water is rushing out, white with foam, directly toward us. It will not be long before the water has all run out and the ship been dropped to the lower level and then be ready to leave the lock. The lower level is shown in the foreground, and on it another vessel is waiting to enter the lock and be raised. On the right-hand side of the power house a third vessel has been lowered from above and is just passing out of the other lock.

Probably none of the large-sized locks in the world are more busy than these two at St. Marys Falls. More ships pass through this canal in a year than through any other ship canal,—three times as many as at Suez. They carry over 30,000,000 tons of freight and thousands of passengers.

When two locks are placed side by side, as these two are, they are said to be "in duplicate." If Lake Superior were much more than 20 feet higher than Lake Huron, one lock would probably not be able to do the work of raising and lowering the vessels. Several locks might then be built,—one directly following the other, and each capable of raising or lowering ships for a part of the full distance required. The locks would then appear somewhat like great steps, one above the other. A number of locks so arranged are called a "flight of locks." "Flights of locks" may also be "in duplicate."

We can now understand what is meant by a lock canal. The Erie canal, for instance, between Albany and Buffalo,

is only seven feet deep, and is not therefore a ship canal; but its locks are on the same plan as those just described, though smaller. In the 387 miles of this canal there are 72 locks. Of the nine ship canals of the world six are of the lock type.

CHAPTER XVI

THE LOCK CANAL AT PANAMA

What is the best type of canal for Panama? At first thought this would not seem to be a difficult question to answer. If a deep channel, at least 500 feet wide at the bottom, could be cut from ocean to ocean and could be kept clear for the passage of ocean vessels of the largest size, it would be, of course, the ideal canal. But it is certain that such a sea-level canal would cost at least $500,000,000 more than a good lock canal and would require very many years to build. The idea of ever digging such an enormous ditch was given up as impracticable more than twenty years ago.

De Lesseps originally planned a sea-level canal. It was to be 29 feet deep and 72 feet wide at the bottom. He declared that it could be built in eight years for about $128,000,000. Before his scheme failed he had been forced to change his plans to the lock type with a depth of only 15 feet.

The United States took possession of the Canal Zone in May, 1904. For more than two years the type of canal that we were to adopt was in doubt. Probably no engineering question of this sort ever aroused more widespread

interest in America. While the preliminary work of cleaning the Zone and making it a healthful place, and securing workmen and machinery, was going on, scores of engineers were at work on the canal plans. Holes were dug and borings made in many places to find out what sort of soil or rock lay beneath the surface. Surveys of all sorts were made and maps drawn. Both Houses of Congress discussed the problem at great length. And magazines and newspapers printed hundreds of articles on the subject.

The Board of Consulting Engineers

In order to secure the most expert advice President Roosevelt appointed in 1905 a board of consulting engineers consisting of thirteen men. Of these, eight were Americans and five were foreigners. This board included some of the world's foremost authorities upon the construction of dams and canals. These men visited the Isthmus, studied all the facts they could secure, and listened to all who had ideas to suggest. Finally, in January of 1906, they made their report. Three Americans and all the five foreigners favored a sea-level canal. The five other Americans voted for a lock canal. At the same time the Isthmian Canal Commission, which was actually to have the digging in charge, voted 5 to 1 in favor of the lock type. So it was difficult to decide which of the two types was really better.

Before we examine the two types more carefully, we should remember the following facts about the canal route. First, a canal of either sort would be fifty miles long, from

Atlantic to Pacific, 41 miles through the land and 9 miles of channel in the harbors at the two ends. Second, the 41 miles through the land naturally divides itself into four parts. From Colon, on the Atlantic, to Bohio, the route passes for 12 miles through low swampy ground not much above sea level. During the next 15 miles, from Bohio to Bas Obispo, the land rises to about 50 feet above sea level. Thence the canal cuts through the hills for 9 miles more to Miraflores. The highest point of land is Gold Hill at Culebra and is 662 feet above the sea. But there is a "saddle" between the hills through which the canal will run, which, at its lowest point is 312 feet above sea-level. This part is the famous Culebra Cut. It is mainly through a moderately hard rock. From Miraflores to the Pacific is a distance of 5 miles and is about at sea level. Third, the greatest difficulty is the control of the floods of the Chagres river and its many tributaries. For 23 miles the route follows the valley of this river and crosses and recrosses its bed. This Chagres is an unruly stream. Though it is only a small stream in the dry season, in flood time tremendous quantities of water rush down its valley. It is estimated that during the great flood of 1879 it was, for several hours, three fourths as large as the Niagara river. A canal of either type must be so built as to provide safe protection from such great floods.

Facts About the Route

Bearing these facts in mind we are now ready to examine the two types. Those engineers who favored a sea-

level canal proposed a narrow channel of 41 miles in length, from 150 to 200 feet in width at the bottom, and 40 feet in depth. This is 10 feet deeper and about 70 feet wider on the average than the Suez Canal. It would not be possible to make the width greater without too great expense. Nor would it be possible to dig a perfectly straight channel as at Corinth. Nineteen of the 41 miles are on curves such that vessels would be obliged to sail very carefully,—not over 4 miles per hour. If two ships were to pass each other, one must be stopped and tied to the bank, in order to avoid danger of collision. Two of the largest ocean liners could not pass at all.

Sea-level Canal at Panama

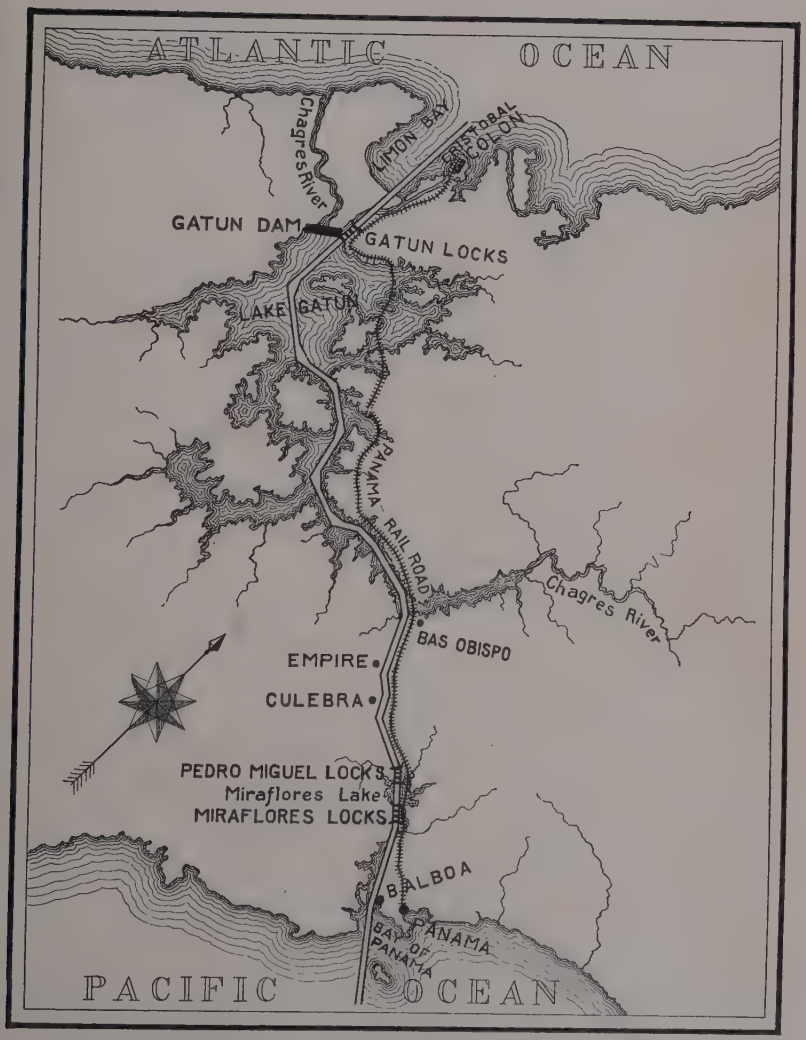
For the first 25 miles from Colon the channel would be largely through soft, swampy mud and not through rock. No one knows whether it would be possible to dig a ditch 50 to 90 feet deep through such material and prevent the banks from constantly caving in and obstructing the channel. Through the 9 miles of the Culebra Cut the ditch would be through rock and from 100 to 373 feet in depth. No such enormous rock cut as this has ever been accomplished.

It is estimated that this sea-level plan would require the excavation of at least 300,000,000 cubic yards of earth and rock. Each cubic yard would weigh about a ton. Can we picture to ourselves such a great mass? If it were piled up into a wall 3 feet wide and 20 feet high, it would extend

entirely around the world at the equator! To dig this canal would require fully eighteen years of labor and between $500,000,000 and $600,000,000 in money. The mind is staggered by these figures.

Now, if we look at Map VIII, we can see what the present lock canal is like and how it differs from the sea-level type. In route and length it measures the same as the sea-level plan. There must be the same channels also in the harbors at both ends. Beginning first at Colon a nearly straight channel has been dug at sea-level for $2\frac{1}{2}$ miles to Gatun. It is 41 feet deep and 500 feet wide. At Gatun a great dam has been built across the valley of the Chagres. This now forms an artificial lake 165 square miles in area. The surface of the water in Gatun Lake, as it has been named, stands 85 feet above sea-level. Beside the Gatun dam, a duplicate flight of three locks has been constructed to raise and lower vessels this distance of 85 feet. For 23 miles beyond Gatun the channel passes through the lake and is from 500 to 1,000 feet in width and from 45 to 85 feet in depth. The same water level continues through the Culebra Cut to the Pedro Miguel Locks, and here the channel measures from 300 to 500 feet wide. At Pedro Miguel one lock in duplicate will raise or lower vessels 30 feet. Below it is the little Miraflores Lake and just beyond it there is a duplicate flight of two locks with a combined lift of 55 feet. Then comes 4 miles of sea-level channel 500 feet wide

Lock Canal at Panama



Map VIII.—Route of Canal and Railroad.

and 45 feet deep to the waters of the Pacific. A simple diagram of this plan may help us to remember the figures.

Its enemies have made the following objections to the lock type of canal for Panama,—first, that the Gatun dam now rests on an unsafe foundation of earth; second, that

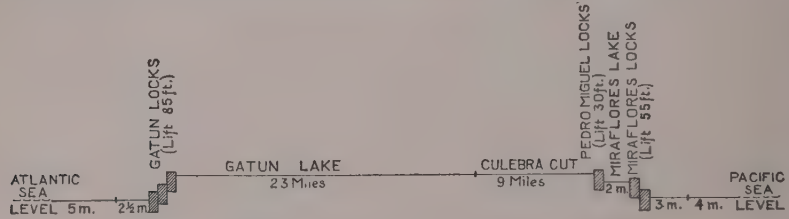


Diagram Showing Lock Type of Canal at Panama.

the locks are so much greater in size than any ever built that serious accidents might happen in them to injure vessels and hinder traffic; third, that the locks will delay the vessels in transit; fourth, that they might be destroyed by earthquakes, and fifth, that an enemy with guns or dynamite might so injure them in time of war as to put the canal out of commission for many months or even years.

The friends of the lock type of canal declare that these supposed dangers either do not exist or are unimportant. They think that the lock canal has many marked advantages. It is estimated that it has been built in one half the time required for the sea-level canal,—that is, in about nine years. It has cost at least $200,000,000 less. It has required only one half the excavation. Dangerous earthquakes, they say,

do not occur on the Isthmus. And because vessels can travel at full speed in Gatun Lake, and will be delayed but three hours in the locks, the total time of transit will be no more than in a narrow and crooked sea-level canal.

Most important of all the advantages, we are told, is the great Gatun lake. It is now so large that the Chagres floods that pour into it will affect its level no more than would a cup of water poured into a tub. The Chagres river will thus serve merely to supply the water necessary to operate the locks. As one well-known engineer has said, the lock canal has transformed the Chagres river "from a dangerous enemy into an excellent friend."

All these points and many others scarcely less important were carefully considered by Congress during the winter of 1905–6. Though a majority of the members of the Board of Consulting Engineers voted for the sea-level type, both Mr. Roosevelt and Mr. Taft favored the lock canal. On February 19, 1906, President Roosevelt, in a message to Congress, declared, "In my judgment a lock canal is advisable." At the same time Mr. Taft wrote of the sea-level canal that "the time and cost of constructing such a canal are in effect prohibitory." After much discussion Congress finally adopted the same view and, on June 29, 1906, voted to build the lock type of canal at Panama. Since that date the work done on the canal has more and more clearly shown the wisdom of this choice.

Decision in Favor of a Lock Canal

CHAPTER XVII

BUILDING THE CANAL

To many of us the study of types of canals will be rather tiresome and the figures hard to remember. Instead of carrying this on further, let us imagine ourselves going out for a day's trip, in the year 1910, to see the machines and men at work on the great ditch. It will be more interesting. If we do succeed in remembering some facts about the lock type, we shall understand more easily what they are trying to do.

Scarcely two miles from the City of Panama is the Pacific end of the canal. It comes out into a large bay or harbor at the base of Ancon hill. This is called the Port of Ancon. At the mouth of the canal is a small town named La Boca, or Balboa, as it has more recently been called. There is a good chance that we shall see in the harbor near Balboa some old French ladder dredges. They have been repaired by our men and put to work at the task of cutting out a channel from the canal mouth to deep water in the Pacific. Each dredge has a series of large buckets on a sort of endless chain. A powerful arm carries the buckets to the bottom and when they are set in motion they each cut away and bring up and

Dredges

dump a small load of earth. The material which is thus dredged up is loaded on scows and carried where needed, or more often carried far out to sea and dumped.

There is also another old style dredge at work. It is

An Old French Ladder Dredge—La Boca.

known as a dipper dredge, because it has a very long arm with a sort of dipper on the end. With this it reaches down and scoops up the bottom.

If we count the channels to be dug in the harbors at Colon and Balboa, as well as the low swampy parts of the canal at each end, we shall find that nearly sixteen miles will be cut out by dredges. This method is so much cheaper

TWENTY-INCH SUCTION DREDGE, CHAGRES RIVER, GATUN.

than any other way of digging, that our engineers use dredges wherever possible.

The American suction dredges are much more powerful than the old French machines. What odd-looking affairs they are, like great, floating docks with engines and machinery on board and with a deck and rooms above for the workmen to live in. Each dredge has a tube stretching

"Men at Work Drilling Holes for the Charges."

away from it like an enormously long tail. Upon inquiry, we shall find that each dredge has large suction pipes that extend downward to the soft muddy bottom. This is rapidly sucked up through the pipes and then forced out

through the long tube and deposited wherever it is desired. When the bottom is too hard for the suction pipes to draw up, it is often loosened by charges of dynamite. This

Loading Drill Holes with Dynamite.

method of digging by dredges costs only about eleven cents per cubic yard. As fast as a dredge cuts out the channel it is floated along from place to place. In very hard soil or rock, a dredge is of no value.

Blasting

Another interesting feature of the work is the blasting. It would be safe to say that without powerful explosives the canal could not be built. Dynamite is the chief one used. In the year 1908, 8,850,000

pounds were shipped from the United States for use during the next twelve months in the Canal Zone.

All along the portions of the canal that extend through rock and hard soil, we can see the men at work drilling the holes for the charges. Some are made only 3 or 4 feet deep, others are 10 or 20 times that depth. These drills are about the noisiest machines on the canal. The clatter of a half dozen of them is almost deafening. They

EXPLOSION IN PROGRESS, MATACHIN.—19 HOLES, 11,200 POUNDS DYNAMITE, 17,980 CUBIC YARDS DISPLACED, JANUARY 10, 1908.

are worked by compressed air from the power plants. It is brought in long pipes to each drill.

Usually many holes are drilled for each explosion of

dynamite. They are skillfully arranged by the "powder men" to get the greatest possible effect. When the holes are all charged, the drills are moved away and the workmen retire to a safe distance. An electric wire extends to a cap

Loading Dirt Train by Steam Shovel.

in each hole, and pressure on a single button sets off the entire charge. A rumbling sound is heard. The earth in the neighborhood heaves and trembles. And great masses of mud and water and rock are thrown into the air. It is often the case that a number of tons of dynamite are exploded at one time. Imagine an amount of rock larger than a six-story building torn away by one explosion, and

broken and churned into such small pieces that it can be at once loaded on cars and carried away.

In the care and use of the dynamite the workmen have become very expert. It is true that every now and then the charge in some particular hole fails to go off. This fact will probably escape the notice of the men. When later the hole is disturbed an explosion may occur and cause much injury or even death. The hospitals treat many men injured by the blasts. But on the whole the serious accidents are surprisingly few.

Steam Shovel—Showing Arm and Dipper.

When the soil or rock is shattered by the blast, the steam shovels can dig it up and load it on the dump cars. Long trains of these loaded cars are constantly being drawn out of the great ditch. They will be dumped at some convenient point and the cars rushed back for fresh loads.

There are about one hundred steam shovels at work on the canal. It is certainly fascinating to watch one of them.

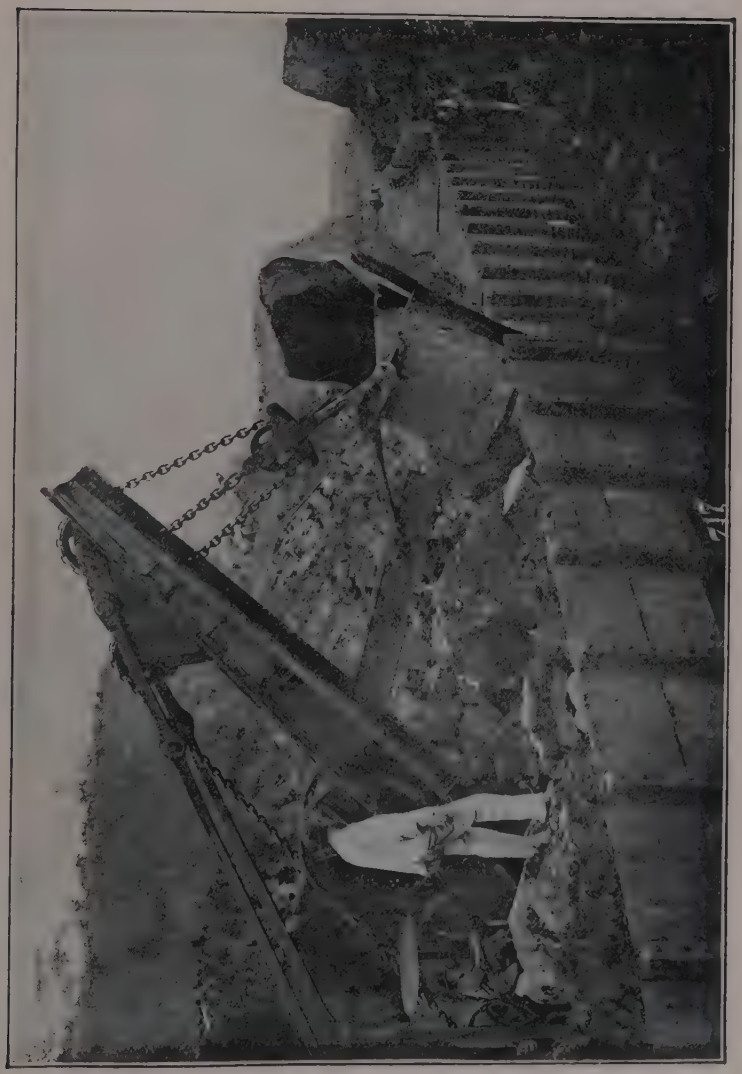
Running on a little track of its own, it slowly moves forward, as it eats its way through the broken rock or soil.

Steam Shovels

Let us go up close to it in order to see exactly how it is built and how it works. Note the letters I. C. C. on its side. These mark it as the property of the Isthmian Canal Commission. And note also, the smaller letters which tell that it was built at Marion,

A Five-yard Dipper.

Ohio, or at South Milwaukee. The shovel itself seems to be somewhat like a long railroad flat car. Covering a large part of the car is a sort of iron hood. Inside of this hood is the powerful engine and the wheels and gears that control



"Up Comes the Rock, Nevertheless."

the shovel. Attached to the forward end of the car is an immense steel arm. This arm can be swung freely from side to side by large chains connected with the machinery inside the hood. Swung from the arm is a great shovel or dipper, as it is called. On the larger steam shovels the dipper is of sufficient size to hold five cubic yards of material. This means nearly five tons of earth or rock. The bottom of the dipper can be swung open at will, in order to dump out the contents upon the flat cars. On a seat at the base of the long arm sits the man who guides its movements.

As we stand watching, a locomotive pushes up beside the shovel a long train of empty flat cars. With a loud clatter of chains and the hiss of escaping steam the dipper is lowered. See the almost human way in which it digs in its teeth and comes up again full of the rough, broken material. The long arm swings the dipper over a flat car, the bottom opens, and the load is dropped on the car at the exact spot where it is wanted. And back again goes the dipper for another load. Perhaps this time it is a single great rock that is to be lifted. To get beneath this rock and to nicely balance it on the dipper requires such wonderful skill on the part of the steam shovel men as only long practice can give. Up comes the rock, nevertheless. Before we realize it, the flat car is loaded and another is pushed into its place. And so the work goes on from hour to hour with much noise and steam and smoke.

The Cut at Bas Obispo—November, 1906.

Upon the locomotive engineers depends the important work of supplying empty cars for the steam shovels to fill. Unless there are cars at hand the shovels must stop. So there has grown up among these engineers a rivalry to hold the record for the largest number of cars handled in a day or week or month. Each engineer takes unusual pride in his engine and his record. Each is determined to beat the others.

Rivalry for Records

This same rivalry is especially keen among the steam shovel men. Every crew is anxious to hold the record for the largest amount of material excavated. Each shovel is pushed to the limit of its capacity. In an eight-hour day one of them has been known to excavate and to load on cars almost 3,500 cubic yards. This means about 160 car loads or one car every three minutes. In the Canal Record, a paper issued weekly in the Zone, the best shovel records are published. Take as an example the issue of May 26, 1909. More than a column of the paper was occupied by the records of the steam shovels for the month of April. The following is a single paragraph:

> The record for a single day's excavation was broken on April 8, when 57 shovels took out 78,559 cubic yards, an average of 1,387 cubic yards per shovel. The best day's record for one shovel during the month was on April 12, when No. 266 in the Culebra District excavated 3,340 cubic yards.

We can easily understand the pride which the crew of shovel No. 266 took in their shovel and their record, and the struggle which they would make to continue to hold it.

We cannot fail to note, as we examine the men at work, that the same spirit seems to animate all the "Gold Men." The American laborers know that they are down here on the Isthmus for a great purpose. When off duty they are

Steam Shovel at Work on the Site for the Pedro Miguel Locks.

a joking, jolly lot of men. But when at work the set, stern expressions on their faces show that they know that their work requires the best that is in them. In some ways the great steam shovels and their crews, more than anything

else in the Canal Zone, seem to represent that fine, determined, fearless, and energetic American spirit, that we believe will conquer all difficulties in the end and complete the canal.

Long Trains of Flat Cars at Bas Obispo.

Forty-four Tons of Silver

Interesting to spectators as well as to the workmen is the coming of the pay train each month. Though there are between 30,000 and 40,000 men at work daily, the entire length of the canal is so great that only a few can be seen at any one place. We shall find no better opportunity to observe large groups of the men than at the stations where the pay train stops. It is interesting to note also the large amount of coin han-

dled by the paymaster. The silver pay roll amounts to nearly $1,600,000 in Panamanian money per month. Each $1,000 weighs fifty-five pounds. The total, therefore, equals forty-four tons. We are told that five men are almost constantly at work counting this money and putting it up in rolls convenient for payment.

Only those who visited the canal as far back as 1904 can

"Coming of the Pay Train."

fully appreciate all that has been done along the route to make it a comfortable and healthful place in which to work. When we reach such a neat, clean, well-built town as Culebra, for instance, we

Culebra

CULEBRA FROM RESERVOIR HILL.

can scarcely realize that here was once a dense jungle unfit for human habitation. Now we find a town of 5,000 people. It has its own electric light plant, water works, sewage system, library, and club houses. The streets are clean and the houses dry and comfortable. So it is all along the line.

Of course, the two points of greatest interest are the Gatun Dam and the Culebra Cut. The monster dam is to be nearly a mile and a half long, across the Chagres valley. It is difficult to find a point from which we can view the whole of it. Let us take our stand on the hillside near the cut for the Gatun locks. In the distance are the hills on the opposite side of the valley, and spread out before us is the valley itself with the Chagres river winding back and forth along it. At our feet is the cut for the flight of three locks. They will have a usable length of 1,000 feet, a width of 110 feet, and a total lift of 85 feet. There are no locks of this size in the world. Though the rock cut for these locks is completed, the work of putting in the concrete walls and bottom and the machinery will probably require more time than to complete all the remainder of the canal. A steady stream of concrete is being poured into the cut for all the twenty-four hours of each day. Not until this work is finished can ships cross the Isthmus.

Gatun Dam

The dam itself is beginning to rise across the valley. Dredges and steam shovels are sending in material for it

"The Dam is Beginning to Rise Across the Valley."

in large quantities. Every load will be needed, for the great dam is to rise 115 feet above sea level and will be 100 feet wide at the top and 1,900 feet at the widest part of the bottom. It will be like a small mountain running directly

Excavating for Gatun Locks.

across the Chagres valley; and, as President Taft says, "will be as solid as the everlasting hills." With all its floods the Chagres will require a whole year's time to fill to the required level the basin thus made. Yet some day there will be a fine, deep lake behind this dam. The largest vessels can push through it at full speed without the slightest danger.

But the most impressive sight of all is the Culebra Cut. This is the most gigantic cut ever attempted by engineering science. Culebra is the backbone of the Isthmus. Here the fight with nature is fiercest. Over fifty steam shovels and their determined crews are making the attack. For nine miles the great ditch must be dug down through the solid rock, in places to a depth of more than 300 feet. The shovels are taking out from

Culebra Cut

EXCAVATION FOR GATUN LOCKS COMPLETED.

one million to one and one half million cubic yards per month. Yet how slowly the ditch grows!

Let us look down into it from a point opposite Gold Hill.

Here the cut will be deepest. It is already so enormous that the workmen on the farther side appear like pigmies. How many steam shovels and trains of cars can you count?

"Most Impressive of All is the Culebra Cut."

Can you see the highest line of cutting on the slope of Gold Hill? That is the level where the French started their work. Below this is the American cut. More than eighty feet must still be taken out. Nowhere can we get a better idea of the magnitude of our Government's great task at Panama than right here opposite Gold Hill.

Yet we are told that the Culebra Cut is more than half finished. On this particular nine miles of the canal the

halfway mark of American excavation was passed on October 23, 1909. The record for excavation in Culebra Cut on that date stood as follows:

Excavation by French, 1882 to 1904 ..	24,588,520	cubic yards
Excavation by Americans, 1904 to 1909,	39,002,299	"
Excavation remaining	39,002,299	"

If the present rate of excavation can be maintained, this part of the canal should be completed by the end of the year 1913.

Early in the same month of October, 1909, the grand total of American excavation throughout the entire length of the canal had reached 87,494,537 cubic yards. This was half of the total excavation that was necessary when the United States took possession to complete the canal from sea to sea.

All along the route the work is progressing rapidly. At no time since our government took possession has the number of laborers been so great as during the autumn of 1909. Fewer changes are taking place in the force, and a larger number seem to have come with the intention of working for a long time in the Zone.

Already there are small portions of the canal in which the excavation is nearing completion. Five miles of the channel in the Bay of Panama are open to navigation, as far as the wharves at Balboa. On November 1, 1909, a steam shovel was working on the bottom of the canal near Mindi at forty-one feet below sea level.

It is the construction of the great concrete locks at Gatun and at Pedro Miguel that is expected to delay the opening of the canal until 1915. How tremendous this concrete work is to be, is easy to understand when we are told that at Gatun alone it is estimated that 2,250,000 barrels of cement will be required. Nevertheless the end is now surely in sight. The canal is more than half finished. By 1915 we may hope to see it entirely completed.

On November 22, 1909, Mr. Tawney, chairman of the Committee on Appropriations of the House of Representatives, sent to Colonel Goethals the following message:

"The Committee on Appropriations extend to you and your associates their hearty congratulations on your splendid organization and the marvelous progress you have made the past two years."

When we finally leave Culebra Cut and return by train to Panama City, we shall surely feel that our day on the canal line has been well spent. We shall have a new interest in American methods and American machinery and a new pride in American pluck and energy. F. S. Brereton, a distinguished Captain in the English army, describes conditions in the Canal Zone as "a marvel of organization, and something to be carefully noted and remembered by those who in future have similar work to undertake." The Canal Zone is, indeed, the "best great construction camp that the world has ever seen, and one of which every American should be proud."

CHAPTER XVIII

THE GIGANTIC DAM AND LOCKS

During the busiest years of construction, from 1909 to 1914, a constantly increasing number of sightseers journeyed to the Isthmus and took a trip out over the canal work such as we have just described. The army of workmen, the rushing trains, the great machines, the deepening cuts, the wonderful organization, stirred the imagination and roused increasing enthusiasm for American methods and American workmen. More and more attention was focused on the gigantic dam and locks at Gatun. These were the greatest constructive features of the canal work.

Of the three dams on the canal route the two at Pedro Miguel and Miraflores, near the southern end of the Culebra Cut, are comparatively small. The Gatun dam is the important one. Nearly eight miles from deep water in Limon Bay the hills which bound the lower valley of the Chagres come nearest to each other. Here it is but one and one-half miles across the valley from the hills on one side to those on the other. Had Nature placed a low ridge from hill to hill at this point, a great lake would have extended back for many miles. What Nature failed to do our engineers have done.

Gatun Dam

Midway across the valley rose a small, low hill of solid rock. Securely anchored to the hills at either end and to this central hill, the monster dam completely closes the valley. A mile and a half long, nearly half a mile wide at the bottom, 400 feet wide at the water's surface, 115 feet above sea-level at the crest, its slopes clothed in tropical vegetation, it now appears far more like a low-lying ridge than like an artificial structure raised by the hand of man. Thus the Chagres valley is turned into a huge reservoir. The surface of the lake behind the dam is 85 feet above sea-level and the lake itself extends far up the valley and through the Culebra Cut for more than 20 miles across the Isthmus.

Fully eight years of labor were required to construct the dam. In 1905 and 1906 designs and plans were completed. In 1907 borings were made and test-pits dug over the entire area on which it rests, in order to establish beyond any doubt that the foundations would be both suitable and secure. In 1908 the site was cleared. Then trains of flat cars began to dump masses of broken rock from the steam shovels on other parts of the canal work in two retaining walls across the valley about 1,200 feet apart. These walls were known as the toes of the dam. Into the great space between them suction dredges began, in March, 1909, to pump a mixture of sand, clay, and water. As the water drained away, the sand and clay remained to form the core of the dam. This hydraulic fill, as it was called, continued steadily, as did also the building of the toes, until the dam

was completed in the summer of 1913. The total of all the material put into it was more than 30,000,000 cubic yards.

How well the work was done and how wise was the choice of the site were shown when the lake rose to its full height. No water was able to force its way through or under the dam. The saying of Ex-President Taft that the dam "will be as solid as the eternal hills" seems to have proved true.

Every dam must have a spillway or place through which

GATUN DAM SPILLWAY. ALL CREST GATES IN POSITION. WATER RUNNING THROUGH TEMPORARY OPENINGS.

the surplus water behind it may flow off. To maintain the lake at the desired level and to store water for the use of the locks during the dry season such a spillway had to

be built into the Gatun dam. Through the solid rock of the little central hill a channel about 300 feet wide was cut, with its bottom not much above sea-level. This channel was then lined with concrete and a massive concrete spillway constructed across it. On the top of the spillway abutments and piers were raised to the full height of 115 feet. Between these piers 14 gates were placed and machinery for raising and lowering them. By operating these gates the surface of the lake is kept at the desired level. Each gate is 47 feet long and 19 feet high and weighs 44 tons. It was built of steel girders and sheathing, and these were put together at some distance from the dam. To construct these gates was a work of great accuracy, as only one-eighth inch play was allowed between the gates and their bearings. So nicely was the work done that when the gates were finally loaded on flat cars, moved out over the dam, and dropped into place, each fitted precisely into its bearings, even though in one case there proved to be but one-sixteenth inch play.

The Spillway

The first gate was installed in December of 1912, and all were in place and closed by July 1, 1913. By December of that year the lake had reached its operating level.

The spillway was so constructed that a part of the overflow from the lake passes through a power house below and generates electricity to operate the lock gates, machine shops, and dry dock, to light the locks and Zone towns, and to perform many other services along the canal.

And so, what De Lesseps and his associates laughed at as impossible when it was first proposed in Paris thirty-five years before, became an accomplished fact. A great lake was created on the surface of which ships may cross over the greater part of the Isthmus. One observer has declared that the dam and lake are "undoubtedly the greatest liberty we have taken with the landscape." This is no doubt true. Yet the dam and lake fit so naturally into the conformation of the region that they seem "to have been there from the dawn of time."

To use the lake, ships must, of course, be raised and lowered the 85 feet from sea-level to its surface. This great task the locks perform. On the Pacific slope, the locks are separated into two parts, — one at Pedro Miguel and one at Miraflores. The chief interest in the locks centers at Gatun, for here the locks on the Atlantic slope are massed together in one great duplicate flight.

Now that the water has been let into the latter, visitors cannot get so powerful an impression of their enormous mass and strength as during the years of their construction. "It is impossible to convey in words," said a distinguished writer, "anything approaching an adequate conception of the picture which the series of locks, with their massive, towering walls, and their equipment of colossal gates, presents. It defies description, as it does the camera. It is stupendous, prodigious, overwhelming, — even these adjectives are inadequate."

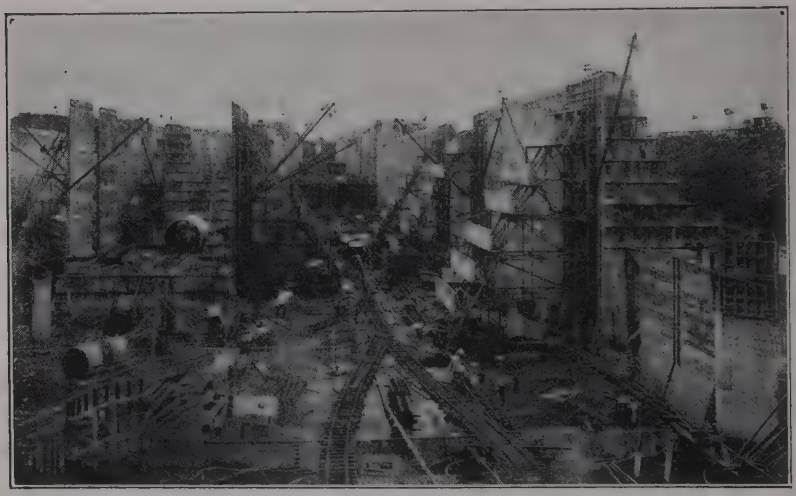
We have already learned that by 1909 the site for the locks at Gatun was prepared. At one side of the dam and for a distance of nearly three-quarters of a mile steam shovels

CHAMBER CRANES IN OPERATION AT MIRAFLORES.

had dug down into the solid rock for foundations. Mixing plants to handle the sand, crushed stone, and cement were built. Towers, tracks, cableways, cranes, and buckets were made ready for laying the concrete. Then slowly the great floor of the locks was laid down, — 400 feet in width and more than 3,000 feet in length. Into this floor many passages, called lateral culverts, were built

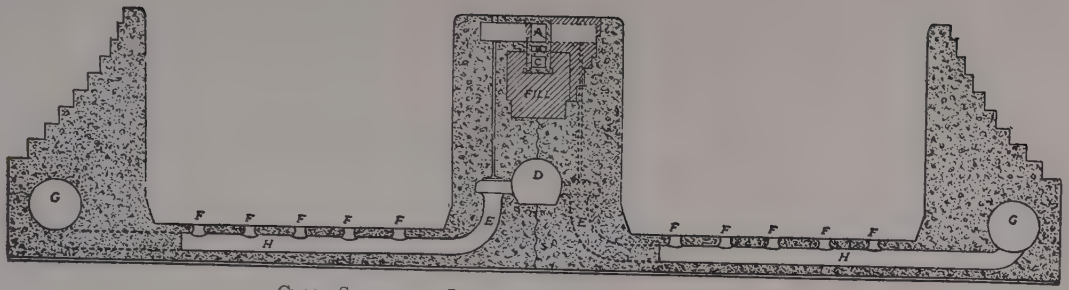
Gatun Locks

to carry the water to and from the lock chambers. From these culverts thirty openings or wells were extended upward into the chambers. A diagram of a cross section of the lock chambers will help us to understand how this was done.



"Work on the Side and Center Walls." Note the Tapering Side Wall.

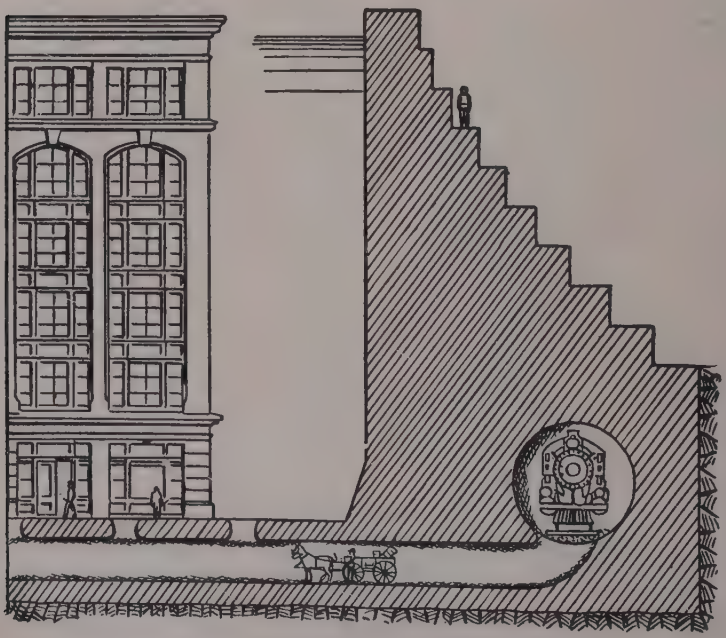
When the floor was at last completed the work on the side and center walls began. The side walls were built 45 to 50 feet in width at the surface of the floor and were perpendicular for their entire height on the inner face. On the outer face, at a point 24 feet above the floor, these walls began to taper until they were but 8 feet in width at the top. The middle wall was made 60 feet in width and perpendicular on both faces. All three walls extended upward over 80 feet.



CROSS SECTION OF LOCK CHAMBER AND WALLS OF LOCKS.

A — Passageway for operators.
B — Gallery for electric wires.
C — Drainage gallery.
D — Culvert in center wall.
E — These culverts run under the lock floor and alternate with those from side walls.
F — Wells opening from lateral culverts into lock chamber.
G — Culvert in side walls.
H — Lateral culverts.

Into these walls still larger culverts were built to convey water to and from the lateral culverts. To fill a lock 1,000 feet in length and 110 feet in width requires a large amount of water. To raise or lower vessels without delay the water must be let in or drawn off with great rapidity. Hence it was necessary to make all culverts of large diameter. How huge indeed are the walls and culverts is shown by the little sketch in which the former are compared in size to a six-story building and the latter are shown to be quite large



SIDE WALL OF LOCKS COMPARED WITH SIX-STORY BUILDING.

enough for a horse and wagon or for a full-sized locomotive to pass through. The upper part of the middle wall was so built that there are in it three tunnels or galleries. The lowest is for drainage. The middle is for the electric wires that carry the current to operate the lock gates and machinery. The upper is a passage for the operators.

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"Like the Walls of a Great City." Lower Locks at Gatun.

Growing slowly upward from the foundations during the years from 1910 to 1914, the walls at length reached their completed state. Then it was that their tremendous strength and massiveness could be appreciated. More than

2,000,000 cubic yards of concrete had gone into them. The colossal walls towered upward, as the artist Joseph Pennell declared, "like the walls of a great city."

LOCK CHAMBER AT GATUN. NOTE THE GATES AND THE OPENINGS FROM LATERAL CULVERTS IN THE BOTTOM.

With the lock walls completed the time had come to erect the lock gates and to place the machinery for operating them. The gates are of steel plates on a framework of steel. They are 7 feet thick, 65 feet long, from 47 to 82 feet high, and weigh from 300 to 600 tons. Yet when set up they were so skillfully constructed and so nicely balanced that they move easily, quickly, and smoothly.

But lock walls and gates are not in themselves sufficient to ensure the safe passage of vessels. No ship can be permitted to enter or to pass through a lock under its own power. On the top of the walls of each lock tracks were laid and electric towing locomotives supplied to tow vessels into and through it. Two of these locomotives attach

ONE OF THE LOCKS AT MIRAFLORES, SHOWING THE LIFT OF TWENTY-EIGHT FEET TO THE NEXT LOCK, A NEARLY COMPLETED PAIR OF GATES, AND ONE OF THE THIRTY HOLES THROUGH WHICH THE WATER ENTERS.

hawsers to the stern of each ship, and two to her bow, and are thus able to regulate to a nicety the progress through the locks. These locomotives are equipped to climb the steep inclines from one lock level to another.

Except for the movement of these locomotives all other operations necessary to pass a vessel through the locks are directed by a single operator high up in a building on the lock walls from which he can observe the entire passage from end to end. Electric switches on a great control-board make him complete master of the locks.

Since ships are expected to pass through the locks by night as well as by day, the locks are lighted by electricity. On all the locks of the canal there are more than 500 lamp-posts.

To these devices for securing the safe passage of vessels there were added also every conceivable protection for the locks and gates. All the locks are protected by great fender chains, so that if by any chance the operators lost control of a vessel and it was in danger of ramming the walls or gates, its movement could be at once checked before damage was done. These chains, 24 for the entire canal, are among the largest ever constructed. Their average length is 427 feet and their average weight about 18 tons. As an added protection against flooding the locks emergency dams were placed on the lock walls. Should necessity arise, the dam framework can be swung out over a lock, the gates lowered, and the water from above safely held back.

In 1913 the locks were so nearly completed that water could be let in and the first vessels passed through to test the operation of gates and machinery. The west flight at Gatun was the first to be tested. September 26, 1913, was indeed a memorable day in the history of American

EMERGENCY DAM SWUNG ACROSS LOCK. GATES BEING LOWERED.

work at Panama. During that day crowds of spectators had been gathering at the locks to watch the water let in through valves and culverts from the lake above and to see it pass on down to the lowest lock chamber. At 4: 45 P.M. the sea gate was swung open

First Lockage

First Operation of Gatun Locks. Crowds on Walls and Lower Guard Gates Watching Water enter West Chamber of Lower Locks.

and the tug *Gatun*, with flags flying, whistles blowing, and crowds cheering, passed into the lower lock. The gates were closed behind her. Without accident or delay of any sort she went on smoothly upward from lock to lock and

"She went on smoothly upward from Lock to Lock."

out on to the broad expanse of Gatun lake. The locks and operating machinery had met every test and had responded to every demand made upon them. It is true that the *Gatun* was but a tiny boat when compared to the great vessels that now pass through the canal, but the successful operation of the locks was assured. The capacity of Gatun locks was more nearly tested on October 9, when a

dredging fleet of thirteen vessels was lifted together through them from sea-level to the lake.

Dredging Fleet entering Upper West Chamber of Gatun Locks, October 9, 1913.

The first lockage at the Pacific end was accomplished on October 14, with the same precision and speed as at Gatun, and by May, 1914, for all the locks, more than 100 lockages had been successfully made.

On June 8, 1914, as a final test of the ability of the locks to handle ocean-going vessels of large size, Colonel Goethals ordered the *Alliance* of the Panama Railroad Steamship Line to pass up through the Gatun locks to the lake

THE FINAL TEST.

Steamship *Alliance* being towed by electric locomotives through Gatun Locks. Locomotive in foreground beginning to climb incline to next higher lock.

Dredging Fleet entering East Chamber of Pedro Miguel Locks on October 24, 1913.

and return. This was accomplished "without a hitch of any kind."

The gigantic dam and locks were thus completed.

CHAPTER XIX

THE CANAL COMPLETED

As work on the canal neared its end, certain days were marked as days of unusual interest. They were days which signified the completion of important parts of the great task. Five of these days are particularly worth remembering. One, September 26, 1913, we have already noted. On that day the tug *Gatun* made the first passage through any of the canal locks.

Of equal interest was an event which had occurred four months earlier, on the 20th of May, 1913. The great Culebra Cut was nearly finished. For nine years the excavation had been going on there. Nearly 100,000,000 cubic yards of earth and rock had been removed. Throughout a large portion of the Cut the bottom level had already been reached. One great portion still remained to be dug away. At one end of this, steam shovel No. 230, and at the other end No. 222, began to dig toward each other at the final level. When they met on May 20 the bottom had been reached for the entire Cut. What the French had tried in vain to do, what mankind had long hoped for, was at last accomplished. The backbone of the Isthmus was broken and

Culebra Cut Completed

MAY 20, 1913. STEAM SHOVELS MEET ON BOTTOM OF CULEBRA CUT.

the greatest obstacle to the canal was removed. There remained only the work of widening, and of clearing away the débris and the Cut was entirely completed and ready for the water to be let in. By the end of the following summer the drills were at work on the last ledge, and on September 11, 1913, the last steam shovel left the Cut.

To one who stood at the place from which the "Great Ditch" could best be seen, it now appeared like an enormous scar on the face of Nature. For miles it stretched on through the hills. Far above was the line where French

DRILLS AT WORK ON LAST LEDGE IN CULEBRA CUT, — AUGUST 14, 1913.

excavation ceased and far below the bottom reached by American energy and perseverance.

DEEPEST EXCAVATED PORTION OF CULEBRA CUT. GOLD HILL ON RIGHT AND CONTRACTORS HILL ON LEFT.

Only the broad dike at Gamboa kept the waters of Gatun lake from flowing into the Cut and extending through its full length to Pedro Miguel locks on the Pacific slope.

The Cut Flooded

The third memorable day came on October 10, 1913, when the Gamboa dike was blown up by a single great explosion of dynamite. For a week water had been running into the Cut from four

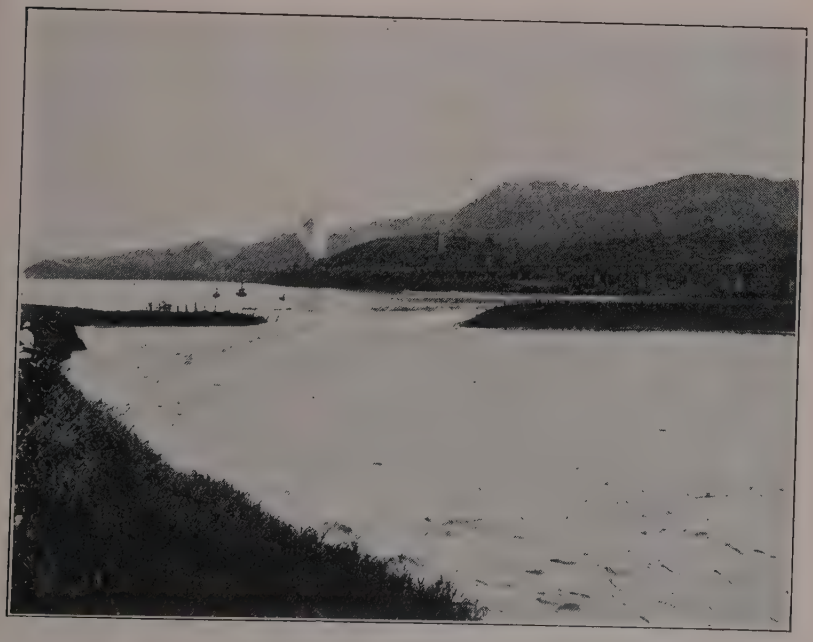
Blowing up Gamboa Dike.

24-inch pipes extending from the lake through the dike, but as yet it was only partially filled. Into the dike itself, which was 600 feet long, 1,277 holes had been drilled to a depth of 20 to 35 feet each and had been charged with dynamite. The length of these holes, if placed end to end, would have equaled nearly eight miles. The blast was to be set off by the throwing of a small electric switch. The latter had been connected by cable with Galveston, Texas, and from there by telegraph wires with Washington, D.C., a total distance of 2,000 miles. President Wilson had agreed to press a lever in the nation's capital which would blow up the dike and bring the canal one step nearer to completion.

On Friday, October 10, witnesses gathered in large numbers on hillsides and canal banks. At 2:02 P.M. the President pressed the lever, and the electric current sped away on its mission of destruction. At Gamboa the earth shook and heaved upward with the mighty impulse. High into the air shot a mass of water, smoke, and fragments. Gamboa dike was gone. A great volume of water rushed in to fill Culebra Cut to the desired depth.

And now it would seem that the canal work was done. The Gatun dam and lake were finished, the locks practically completed, the hills pierced by the great Cut, and the water let into it. But the forces of Nature were not yet wholly conquered. One more obstacle tried the skill and patience of our engineers.

We have already seen that as the Cut was sunk deeper and deeper, the banks had a tendency in places to give way. Masses of earth and rock slipped down into it and buried tracks, steam shovels, and other machinery. Often months were required to remove material from the Cut which had slipped in in a few hours' Slides



"A Great Volume of Water rushed In."

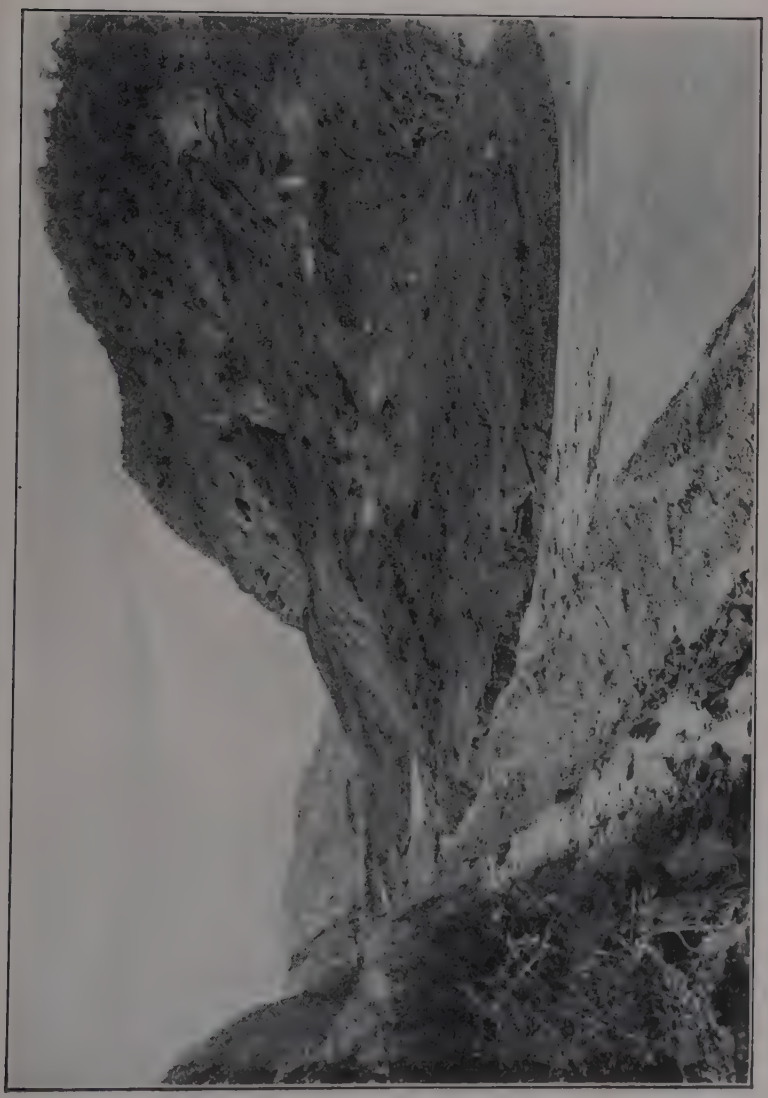
time. Then, too, the weight of these slides frequently upheaved the bottom of the Cut, displaced tracks, and caused an enormous amount of damage and delay. A

dozen or more of these slides had existed for years. The most serious were on the banks of the deepest portion of the Cut, and at Cucaracha a vast slide had impeded progress

Break in East Bank of Culebra Cut. Steam Shovel No. 201 in Midst of Upheaved Material and Displaced Tracks.

almost continuously and greatly annoyed and discouraged our engineers. During 1913 these slides were very active. Just before the time that the Cut was flooded with water through Gamboa dike, fresh breaks occurred and several million cubic yards of material began to slide into it. In fact, the Cucaracha slide completely filled it from bank to bank for a distance of many hundred feet.

With water in the Cut it was quite impossible to remove



"Cucaracha Slide completely filled it from Bank to Bank."

these slides by steam shovel. It was therefore decided to lock dredges upward from the two ends of the canal, to float them into the Cut, and to set them at work cutting

Dredges excavating Cucaracha Slide.

away the slides. This was begun in October, 1913, and by January, 1914, a channel of sufficient width and depth had been secured to permit the passage of vessels through the entire length of the Cut. Many months of steady dredging were still needed to remove the slides entirely from the channel and to reduce them to a point where they would cease to endanger navigation.

January 7, 1914, was the fourth important date. On

that day the derrick barge *Alex. La Valley* made the first continuous passage of a self-propelled vessel from ocean to ocean through the canal. It was clear then that the canal was so nearly completed

Ocean to Ocean

CULEBRA CUT FLOODED. LOOKING NORTH FROM WEST BANK NEAR CUNETTE.

that it could successfully do the work for which it was designed and built.

Shortly after the *Alex. La Valley* passed through the canal the tug *Reliance* came through to Colon from the Pacific entrance. Since this vessel had previously sailed

from Colon via the Straits of Magellan to Panama, it had, when it again reached Colon, the proud distinction of being the first ship of any sort to have sailed entirely around the continent of South America.

The Corozal

Another vessel at Panama with a unique record is the ladder dredge *Corozal*. She was built in Scotland and set out, in 1912, on the long journey from Scotland around South America to the Pacific entrance of the canal, where later she was engaged in dredging

Seagoing Ladder Dredge Corozal.

the channel. In 117 days she covered the total distance of 2,064 miles. It is believed that this is the longest voyage ever taken by a dredge with her superstructure in place ready for digging. She is an excellent example of the

powerful dredges that cut away the Cucaracha slide and will continue to keep the canal free from such obstructions.

During the last years of canal construction a new route for the Panama Railroad was built. A large part of the

PORTION OF RELOCATED PANAMA RAILROAD. LOOKING UP PEDRO MIGUEL VALLEY.

old route was to be covered by the waters of Gatun Lake and a new route was necessary. While the road was being relocated neither labor nor money was spared to make it a first-class line in every respect.

So, too, it was with the fortifications of the canal. A board of competent engineers and military men studied to fortify and to protect the canal so thoroughly that the hun-

dreds of millions of national money spent on the Isthmus might not have been spent in vain and that the canal might be absolutely controlled by our

Fortifications

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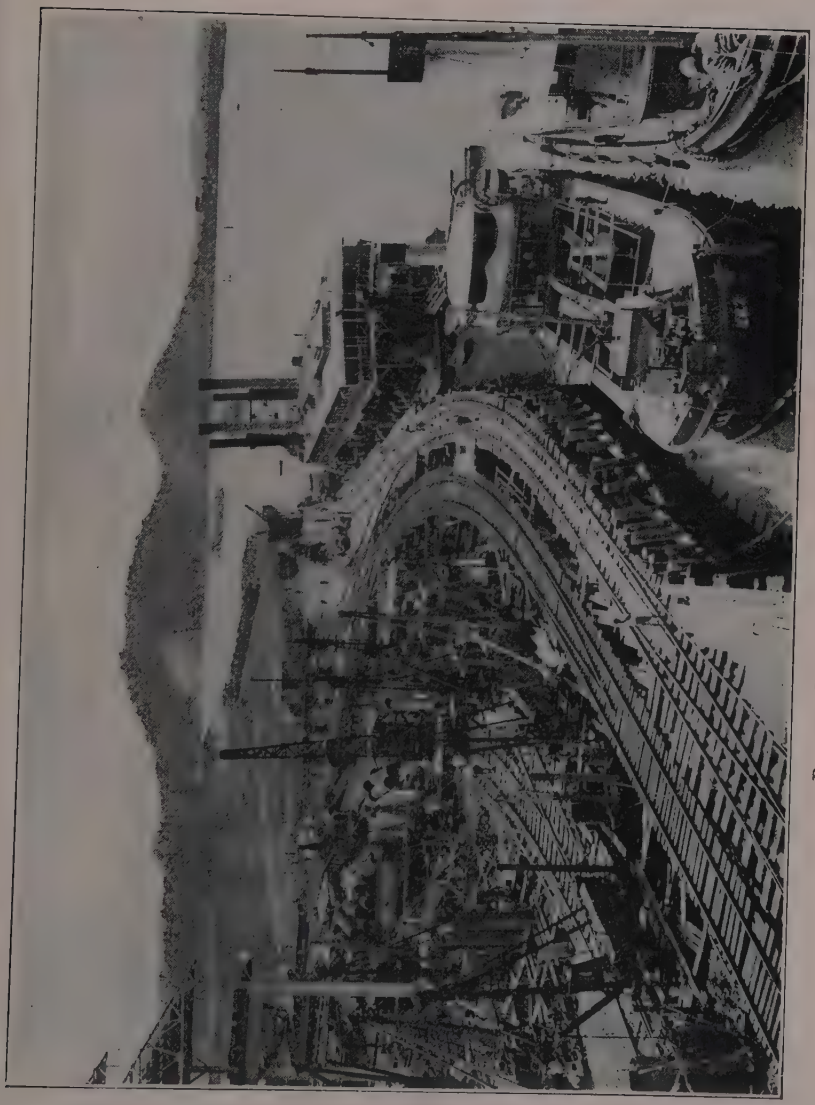
NEW PANAMA RAILROAD STATION IN PANAMA CITY.

country in times of peace and of war alike. All private ownership of land in the Zone was prohibited. Permanent quarters for infantry and artillery were constructed and forts built at either entrance to the canal. The armament in these forts consists of 28 twelve-inch mortars, 12 six-inch guns, 10 fourteen-inch guns, and one sixteen-inch gun. The latter is perhaps the most powerful gun in the whole world. It has an effective range of about 16 miles.



Building Docks and Machine Shops at Balboa.

Early in 1914 the entire canal work was practically completed. The machine shops and huge docks at the terminals, the lighthouses and other aids to navigation, the storage basins for coal and oil, the dry docks, the equipment for supplying all the needs of ships passing through the canal, were all finished or nearly so. Colonel Goethals had been appointed Governor of the Panama Canal and a permanent form of government and a working force provided. Then it was that the last of the five memorable days came. This was May 4, 1914. This day marked the end of exactly ten years of American occupation and work at Panama. It was on May 4, 1904, that the canal property of the French Canal Company was transferred to the United States. It is interesting to note that the other great Isthmian canal at Suez was also ten years in building. The long years of patient toil at Panama were ended. In the next few months the finishing touches were given to the work, in order that it might be wholly completed and ready for the formal opening to the commerce of the world on January 1, 1915.

Ten Years of Canal Work

Thus our government had completed the mighty task. In efficiency, engineering skill, and honest expenditure of vast sums of money it had given an object lesson to the whole world. It had accomplished, as Ambassador James Bryce declared, "the most gigantic effort yet made by man on this planet to improve on Nature."

Great credit, too, is due to the members of the Isthmian Canal Commission. Since March of 1904 the work was under their control. They cleared the ground, laid the plans, hired the men, purchased the machinery, and directed the work. They met and conquered the difficulties. And hardest of all, they bore much undeserved and bitter criticism.

Isthmian Canal Commission

A complete account of the Canal Commission would make too long a story for our attention here. Yet we should know a few facts concerning it. The Commission appointed in 1904 was composed of seven members, with John G. Walker as chairman. The latter was a Rear-Admiral of the United States Navy, on the retired list. He had been at the head of two former commissions which had been sent to study canal routes at Nicaragua and Panama, and was familiar with the general subject of the canal. Associated with him were Major-General George W. Davis and five expert engineers. The Commission thus formed held office for about one year. In July of the same year John F. Wallace, an eminent engineeer of Chicago, was appointed Chief Engineer. Dr. W. C. Gorgas, Colonel in the Medical Corps of the United States Army, was made Sanitary Officer of the Canal Zone. This was the group of men which began the slow and difficult task of preparation with which we are already acquainted. They worked against discouraging odds both at Panama and at Washington, but accomplished much of great value.

ISTHMIAN CANAL COMMISSION IN 1909.

In front center, Lieutenant-Colonel George W. Goethals, Chairman and Chief Engineer. Others from left to right—Major Wm. L. Sibert; J. C. S. Blackburn; Civil Engineer H. H. Rousseau; Joseph Bucklin Bishop, Secretary; Lieutenant-Colonel H. F. Hodges; Colonel W. C. Gorgas; Lieutenant-Colonel D. D. Gaillard.

The Commission was reorganized in April of 1905. Five of the old Commission resigned and five new men took their places. The new Chairman was Mr. Theodore P. Shonts, of Illinois, a railroad president. Mr. Wallace continued as Chief Engineer, but was now also a member of the Commission. Under this new control the work was continued for two years more, except that Mr. Wallace resigned in June, 1905. Mr. John F. Stevens took his place. Both men made first-class records on the Isthmus.

On April 1, 1907, a change in the Commission was again made. There were new conditions at Panama that made the change seem necessary. This time the positions of Chairman and of Chief Engineer were combined as one office, and Lieutenant-Colonel George W. Goethals, of the United States Army Engineer Corps, was appointed to fill the place. Furthermore, the members of the new Commission were ordered to make their headquarters at Panama instead of at Washington, D.C., in order that they might be in closer personal touch with the work. Colonel Gorgas was made a member of this Commission and continued in charge of the sanitary work in the Zone. This Commission remained, with practically no changes, until the end of the work.

Lieutenant-Colonel Goethals was graduated from West Point in 1880, and became an Engineer Officer in the United States Army. Before the opening of the Spanish War he had had many years of experience in the construction

of dams and locks and had become an accomplished and expert engineer. During the war he was made Chief Engineer of the First Army Corps. He was detailed to the General Staff in 1903. As Chairman and Chief Engineer at Panama he not only won the respect and admiration of all who came in contact with him, but began at once to make greater progress in canal work than was ever thought possible. We cannot look at his erect figure and fine face without knowing that he represents the very best spirit and traditions of the American Army.

The great skill, the high character, and the splendid enthusiasm and industry of this body of men will not soon be forgotten by the American people.

Gorgas

Of Colonel Gorgas, Bishop Bury of British Honduras declared, "He is one of the very best, simplest, and most inspiring men I have ever met." This expresses the opinion of those who know him best. The whole world has honored him for his remarkable record in sanitation and in fighting disease in Panama.

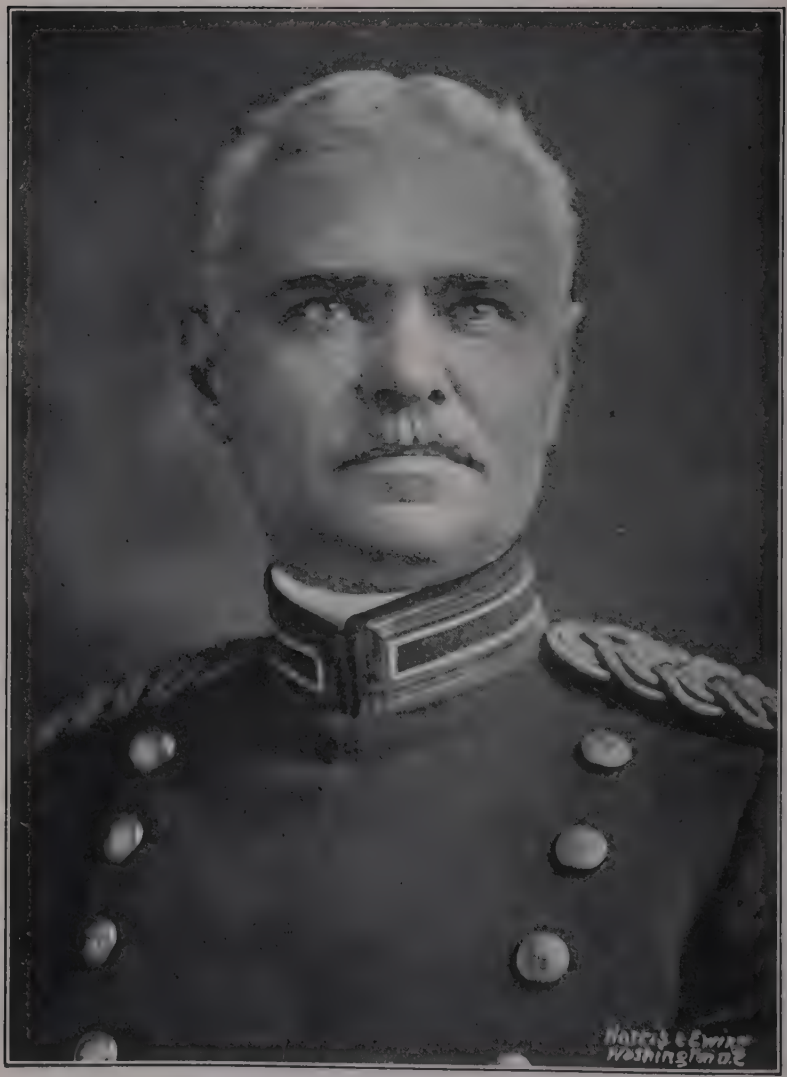
Gaillard

In many way the most pathetic incident in the whole long story of canal digging was the death of Lieutenant-Colonel David duBose Gaillard. With Colonel Goethals and Lieutenant-Colonel Sibert he was the most widely known of the army engineers of the Canal Commission. For seven years his genius directed the construction of the Culebra Cut. Quiet, modest, clear-sighted, he was "a great engineer, an unflinching worker, and a

true gentleman." The strain of work in a tropical climate, the baffling problem of the constant slides in the Cut, and his unceasing application to his work at length, in 1913, broke him down both physically and mentally. His dearest hope had been that he might witness the Cut completed and the water let in; but when Gamboa dike was blasted on October 10, 1913, he lay unconscious in a hospital in Baltimore, and died there on December 5.

Goethals

At the annual banquet of the National Geographic Society in Washington, D.C., on March 3, 1914, President Wilson, in behalf of the Society, presented to Colonel Goethals a special medal in recognition of his eminent services as Chairman of the Commission and Chief Engineer in the construction of the canal. Such a special medal had been awarded by the Society only twice before, — to Robert E. Peary for the discovery of the North Pole, and to Roald Amundsen for the attainment of the South Pole. "I take it for granted," said the President, "that we do not to-night forget that distinguished group of men who have been associated with Colonel Goethals; that gallant and devoted soldier, Colonel Gaillard, who gave his very life to see that a great work was done at the Culebra Cut; that man who made so much of this work possible, Surgeon-General Gorgas, by knowing how to hold disease off at arm's length while these men were given leave to work; also Colonel Sibert, who built the Gatun Dam and created the Gatun Lake, making it look to the eyes of



COLONEL GEORGE WASHINGTON GOETHALS.

the uninitiated as if Nature had done the work over which he himself presided; and also Colonel Hodges, who made the locks and the machinery by which these great things are administered.

"But we are merely to-night acknowledging the presiding character and genius which drew all the elements of this work together, which made it a work done by colaborers, not by rivals; work done as if it were the conception of a single mind; work done in the spirit of service and self-effacement which belongs to a great servant of a great government. There is nothing selfish in the eminence of Colonel Goethals. It is representative of a great profession. It is representative of a great government. It is representative of a great spirit.

"And so I esteem it a real privilege, acting on behalf of this Society, to present to you, Colonel Goethals, this very beautiful medal. It is made of mere gold, and gold is of no consequence in this connection, sir; but it speaks, in the most precious metal we know, the gratitude and the admiration of the nation."

These graceful sentences expressed the sentiments of the American people.

CHAPTER XXI

FUTURE OF PANAMA AND THE CANAL

If we were able to look into the future and to know what the next four hundred years of Panama history are to be, we might find a story quite as romantic and interesting as has been the history of the past four hundred years. Though this pleasure is in part denied to us, we may feel sure of at least a few things that the years will bring.

Growth of Panama

The days of pirates like Henry Morgan are passed. The city of Panama will never again need the protection of its old, moss-covered walls to save it from bands of robbers and cutthroats. Wars may come again and the Bay of Panama be filled with battleships, but homes will be safe and peaceful trade will take the place of plunder.

What a long tale of death by murder and disease has filled the past four hundred years! This cannot be in the future. As the jungle is cut away and the swamps are drained, as roads are built and towns grow up, we may hope to see the whole of Panama as healthful as is the Canal Zone to-day. Colonel Gorgas exploded the idea that white men from Europe and America cannot live with safety in Panama. In fact, American brains and money made the Canal Zone

an object lesson in health for all the tropical parts of the world.

Coal and oil and the precious metals are known to lie buried underneath the hills. And the soil is splendidly rich for all sorts of tropical agriculture. Men are sure to go in larger and larger numbers to make their homes on the Isthmus and to open the mines and to clear the ground. Travelers, too, stop at Panama, especially in the drier part of the year, to see the wonders of the canal and to enjoy the brilliant tropical beauty of the land. The state of Pennsylvania has a population of 6,000,000. Panama is two-thirds as large but has now only 400,000. "The time will come," said an American who lived for more than fifty years in Panama, "when the wild region now included within the limits of the Isthmus will be transformed into smiling summer lands where millions will find homes."

Panama will undoubtedly be greatly blessed in the future by the coming of the canal, but will the canal itself in any way repay our government for its vast expenditure of money? Let us see what the chances are.

Late in the year 1912 President Taft issued a proclamation fixing the rates of toll to be paid by vessels passing through the waterway. Emery R. Johnson, Professor of Transportation and Commerce in the University of Pennsylvania, had made a careful study of all the facts related to canal tolls and the rates which he recommended were those finally adopted. Each 100 cubic feet of earning space in

a vessel is called a vessel-ton. Though there are slightly lower rates for warships, colliers, hospital, and supply ships, and for vessels without cargoes, the usual merchant ship with cargo pays $1.20 per vessel-ton. This amounts to about 60 cents per ton of freight, or roughly one fifth of what was paid per ton to ship such cargo from Atlantic to Pacific by rail at Panama or Tehauntepec.

This is about the same rate as is charged at Suez. To pass through the Suez Canal costs the average freight vessel about $8,000. Such a sum seems very large, and yet the additional cost of the much longer trip around Cape Good Hope is even more. Nearly all steam vessels bound for the ports of Asia from eastern United States or from Europe pay the toll and use the Suez Canal. Since it was opened its total receipts have been over $400,000,000.

Now, whether our canal at Panama will bring in an equally large return or not no one can say with certainty. It depends somewhat upon the growth of traffic in that direction, the cost of fuel, and upon other similar considerations. The growth of commerce through Suez in the ten years following 1900 was 70 per cent. Professor Johnson believed that in twenty or thirty years the traffic at Panama would equal that at Suez and that the receipts from tolls would not only pay the running expenses of the canal but begin to pay back into the treasury of the United States some part at least of the original cost.

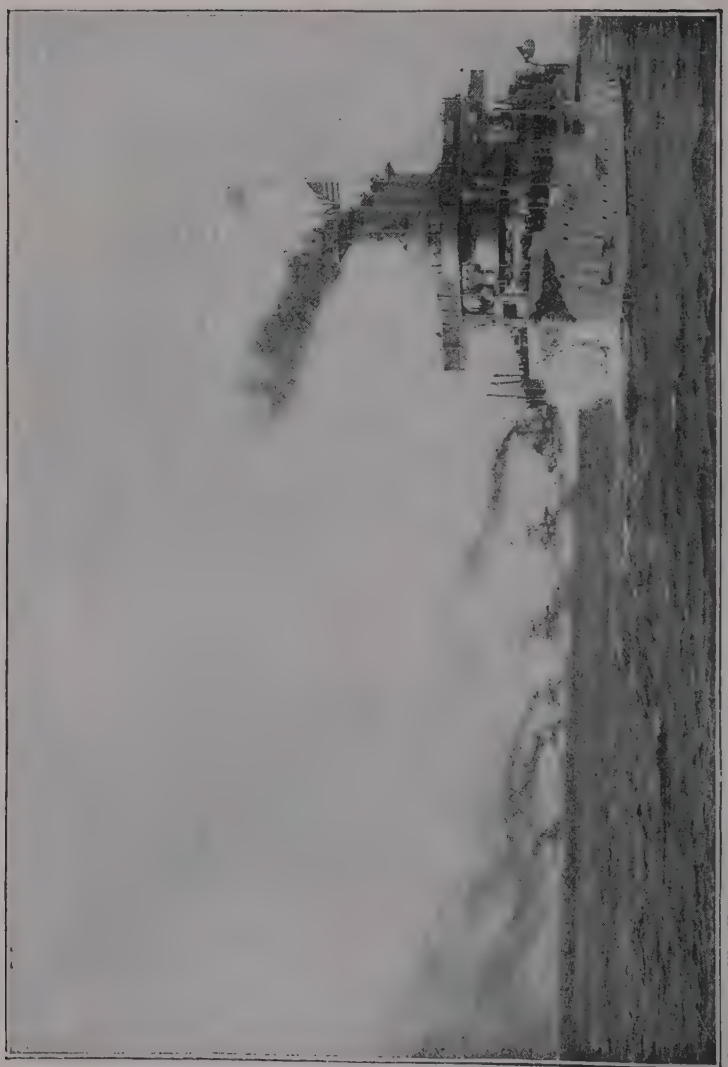
Canal Receipts

To the United States in time of war the canal will be of great value. "Naval experts have said that the canal doubles the efficiency of the American navy." We no longer need to have two fleets of battleships, one on the Pacific and one on the Atlantic, and separated from each other by the whole length of South America. By using the canal one large fleet can guard both coasts with equal freedom. All our interests and possessions on the Pacific feel the military effect of the canal. By increasing the power of the United States in that ocean we may fairly hope that it will contribute much to the peace of the world.

In War Time

But how does the canal affect the United States in times of peace? This is much more important. We note first of all that the canal makes our eastern and western seacoasts practically one coast line, and shortens enormously the distance between the two. A vessel that now leaves San Francisco for New York by way of the Strait of Magellan (Map IX) must travel 13,090 miles. By way of Panama the distance is but 5,300 miles, — or 7,790 miles saved. In the same manner more than 5,000 miles is saved between our Pacific ports and the ports of Europe. San Francisco is within 14 days of New York, by steamers making 16 miles an hour, instead of 60 days, and within 21 days of any English port, instead of 35. This makes possible a great saving in the cost of shipping goods along these routes. Lumber, fish,

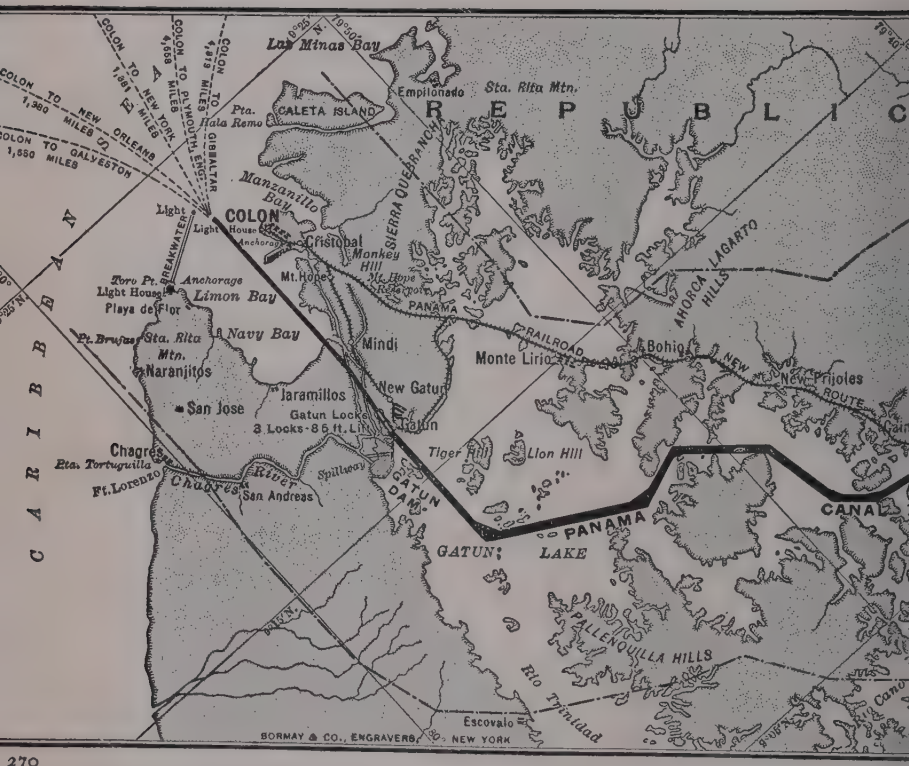
Distances Shortened

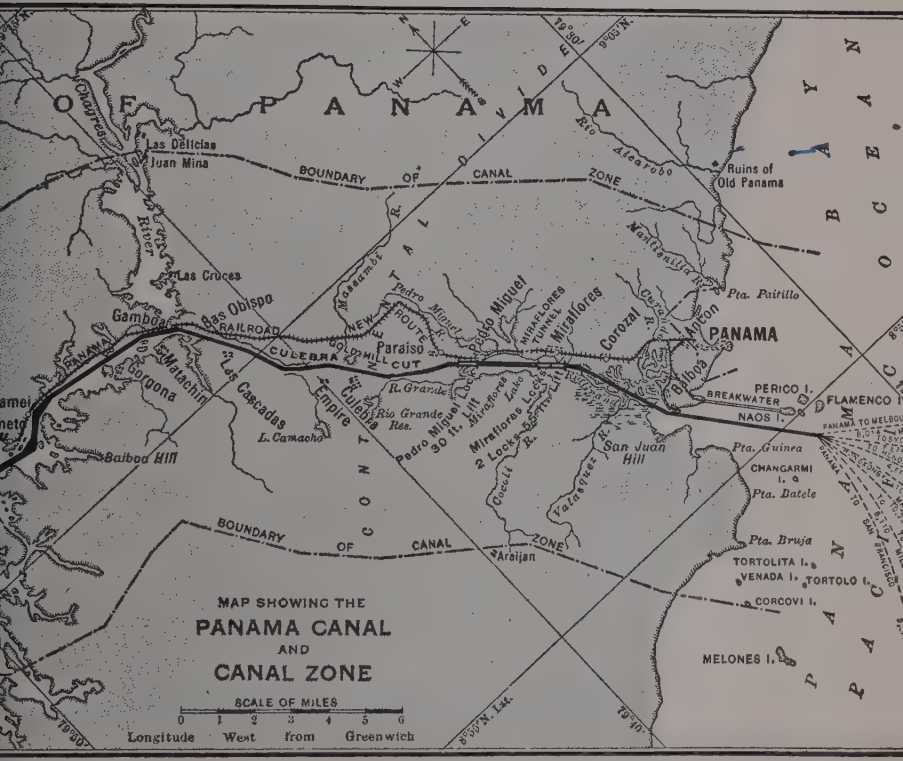


"One Fleet Can Protect Both Coasts"

President Wilson said: "It fails the imagination to think what this work will accomplish. It will create new neighbors. It will generate new friendships; it will make a new atmosphere of rivalry and of generous association. The whole tendency of the routes of trade will be changed, and the routes of trade are the routes of enlightenment."

Now that we are acquainted with Panama and its canal, we can join heartily in the opinion of that Chairman of the Isthmian Canal Commission who once said, "I believe that when, through American generosity and under American control, the canal shall be thrown open to the commerce of the world, it will be hailed, and will prove to be, a priceless boon to all mankind."


Las Minas Bay
Empilonado
Sta. Rita Mtn.
REPUBLIC
COLON TO NEW ORLEANS 1,980 MILES
COLON TO GALVESTON 1,650 MILES
COLON TO NEW YORK 1,851 MILES
COLON TO PLYMOUTH 4,508 MILES
COLON TO GIBRALTAR 4,913 MILES
Pta. Hala Remo
CALETA ISLAND
Manzanillo Bay
SIERRA QUEBRANCHO
COLON
Light House
Anchorage
Cristobal
Monkey Hill
Mt. Hope
Mt. Hope Anchorage
PANAMA RAILROAD
AHORCA LAGARTO HILLS
Toro Pt.
Light House
Anchorage
Playa de Flor
Limon Bay
Navy Bay
Pt. Bruja
Sta. Rita Mtn.
Naranjitos
Mindi
Monte Lirio
Bohio
NEW
New Frijoles
ROUTE
San Jose
Jaramillos
Gatun Locks
3 Locks-85 ft. Lift
New Gatun
Gatun
Chagres
Pta. Tortuguilla
Ft. Lorenzo
Chagres River
San Andreas
Spillway
Tiger Hill
Lion Hill
GATUN DAM
PANAMA CANAL
GATUN LAKE
CARIBBEAN
PALLENQUILLA HILLS
Rio Trinidad
Escovalo
BORMAY & CO., ENGRAVERS, NEW YORK


OF PANAMA
Las Delicias
Juan Mina
BOUNDARY OF CANAL ZONE
Río Algarrobo
Ruins of Old Panama
Las Cruces
Gamboa
Bas Obispo
RAILROAD
NEW ROUTE
Pedro Miguel
Paraiso
CULEBRA CUT
Pedro Miguel Locks
30 ft. Lift
Miraflores Locks
2 Locks 55 ft. Lift
Miraflores Tunnel
Miraflores
Corozal
Ancon
PANAMA
Pta. Paitillo
Balboa
PERICO I.
BREAKWATER
FLAMENCO I.
NAOS I.
Gorgona
Matachin
Las Cascadas
L. Camacho
Empire
Culebra
R. Grande
Río Grande Res.
Baldoa Hill
San Juan Hill
Pta. Guinea
CHANGARMI I.
Pta. Datele
Pta. Bruja
TORTOLITA I.
VENADA I.
TORTOLO I.
CORCOVI I.
MELONES I.
BOUNDARY OF CANAL ZONE
Araijan
CONTINENTAL DIVIDE
PACIFIC OCEAN
BAY
MAP SHOWING THE
PANAMA CANAL
AND
CANAL ZONE
SCALE OF MILES
0 1 2 3 4 5 6
Longitude West from Greenwich
79° 30'
9° 00' N.
8° 30' N. Lat.

INDEX